Attachment to Part – K

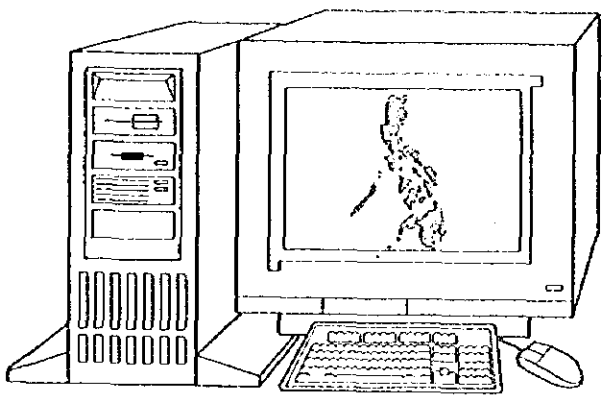
OPERATION MANUAL

FOR DATABASE

MASTER PLAN STUDY ON WATER RESOURCES MANAGEMENT
IN THE REPUBLIC OF THE PHILIPPINES

Operation and Maintenance Manual for Database System

Introducing PHILDB



JANUARY 1998

JICA STUDY TEAM

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Introduction

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1.1 General

This operation manual has been prepared to explain the contents of database file whose name is PHILDB as well as how to run it quickly and properly. It shows user how to do the usual operation such as retrieval, addition and editing of data in PHILDB. The beginner user will acquire the operation method step by step by means of actually operating it because a way of operating is easily understood with a lot of visual examples. When user needs to further develop PHILDB in a different form in the future or learn some of technical aspects involved therein, it is recommended to learn Microsoft Access, a software used to construct the database, first of all.

This database system has been established as a component of the Master Plan Study on the Water Resources Management in the Republic of Philippines (JICA, 1997-1998). In this study, the database system was constructed to store the important data and information that were concerned with water resources development and management in the country. Futhermore, this manual was prepared to properly operate and maintain the database system constructed though the Study.

The database system consists of the following 6 database sub-systems and a tool for hydro-logical statistical analysis by the Gumbel method and Log Pearson Type III distribution.

1) Rainfall Database
2) Streamflow Database
3) Irrigation Database
4) Dam Inventory Database
5) Socio-Economy Database
6) Groundwater Database
7) Tool for Probability Calculation

Outline of the database which is described in each chapter of this brochure is as follows.

Chapter 2 - Rainfall Database - explains the database of rainfall data. User can retrieve daily, monthly and annual rainfall amount from the system which basically stores daily rainfall data. In addition, user can also search the infonnation of location of the rainfall gauging station such as latitude, longitude, elevation, water resources region and province. The data retrieved are provided in a form of daily rainfall data table and monthly rainfall table. In addition to these tables, you can get annual hyetograph quickly. With respect to data input, this database system is prepared in two ways. One of them is the way that users encode the data directly on this system, and other one is to enter into the database the data which have been read from other files such as Microsoft Excel and Text format.

Chapter 3 - Streamflow Database - explains the database of river flow data such as discharge, gauge height and the rating curve. In this database sub-system, user can retrieve mean daily discharge, mean daily gauge height by using retrieval menu or regional map that appears on a computer screen. The retrieved data are derived in a form of mean daily discharge / gauge height tables, annual hydrograph, flow duration curve, mean monthly discharge table, rating table and its graph. With respect to data input, this database system can be constructed in different three ways. The first way is that users encode the data directly on this system, and the second method is entry of the data which read from other file. The third one, if rating table at the gauging station has already been entered in the database system, is to automatically generate discharge from gauge height based on the rating table.

Chapter 4 - Irrigation Database - shows the database that is concerned with irrigation projects. The data of national irrigation system and irrigation water requirement were stored in this database system. Concerning the former, it is possible to retrieve the salient features of each irrigation project. In the latter, you can retrieve annual schedules of cultivated crop and quantity of irrigation water requirement on a 10-day basis which crop needs. It is possible to search these data by using retrieval menu on a computer screen, in which region name, province name and kind of crop are used to classify the necessary data, or regional map. As regards editing data and information, users can encode easily because the menu for data input is prepared.

Chapter 5 - Dam Inventory Database - explains about database on main features of existing and proposed dam in the whole Philippines. In this database system, users can retrieve the information of location, dam purpose, hydrology, reservoir, dam structure and others by using retrieval menu, and edit those data easily using Add / Edit menu.

Chapter 6 - Socio-Economy Database - describes the operation of database which stores socio-economic data such as population, employment and GDP. These data have been collected and estimated by the Socio-Economist of the Study Team. In this database system, user can retrieve the data from retrieval menu or regional map. Thus, users can get the results of provincial and/or regional socio-economic projection, the annual average growth rates in a form of table showing the projected values and their graph for the period from 1970 to 2025.

Chapter 7 - Groundwater Database - explains the database on groundwater. This database focuses on deep well and spring water data of Level III system which deal mainly with the municipal and industrial water use. Number of water resources facilities for deep well, spring and surface water in each water district, its quantity of water and population served in the water district are stored in the database. Users can retrieve the data from regional map or retrieval menu on a screen, which has region name, province name and name of water district. In the database, it is possible to search the data in each water district, and searched data for the water district are also shown on a screen together with the summary of provincial and regional values.

Chapter 8 - Probability Calculation - explains the tool to estimate the probability of meteo-hydrologic events. This tool was developed to calculate the probability of specific meteo-hydrologic data, such as rainfall and discharge, which may be retrieved from other database. The Gumbel and Log Pearson Type III distributions were adopted because these methods are in general used all over the world. Input data of hydrologic events are encoded directly on the form of this tool, and can also be read from other file. In the database, in addition, it is possible to print out the results of the probability analysis with log-normal probability paper with plotting position by Hazen formula.

Chapter 9 - Maintenance - describes the matters to be noted to manage and maintain the database system in the future. The database system and its equipment such as hardware, software and other materials are to be transferred to NWRB after the completion of the Study. Thus, these will have to be managed and maintained by NWRB for the future use. Especially, it is recommended that users should take a backup to the other media such as external harddisk, floppy disk regularly in order to safeguard the files against unexpected loss.

1.2 What's Database Objects ?

In this section, the basic database objects are explained to aid your understanding in this manual. The database file (*.mdb) consists of database objects such as Tables, Queries, Forms, Reports, Macros and Modules.

 **: Tables**

A table is a collection of data about a specific topic, such as products or suppliers. Using a separate table for each topic means you store that data only once, which makes database more efficient and reduces data-entry errors. Tables organize data into columns (called fields) and rows (called records).

 **: Queries**

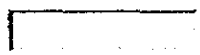
Queries are used to view, change, and analyze data in different ways. And it is also used as the source of records for forms and reports. The most common type of query is a select query. A select query retrieves data from one or more tables using specified criteria.

 **: Forms**

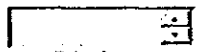
Forms are used for a variety of purposes. Most of the information in a form comes from an underlying record source. Other information in the form is stored in the form's design. The link between a form and its record source is created by using graphical objects called controls. The most common type of control used to display and enter data is a text box.

 **: Modules (Event procedures)**

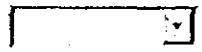
A module is a collection of Visual Basic for Applications declarations and procedures that are stored together as a unit. There are two basic types of modules: class modules and standard modules. Each procedure in a module can be a Function procedure or a Sub procedure.

 **: Text Box**

Use to display, enter, or edit data in a form's underlying record source, display the results of a calculation, or accept input from a user.

 **: List Box**

Displays a scrollable list of values. In Form view, user can select from the list to enter a value into a new record or to change the value in an existing record.

 **: Combo Box**

Combines the features of a list box and a text box. User can type in the text box or select an entry in the list box to add a value to an underlying field.

 **: Option Button**

Use as a stand-alone control bound to a Yes/No field, an unbound control for accepting user input in a custom dialog box, or part of an option group.

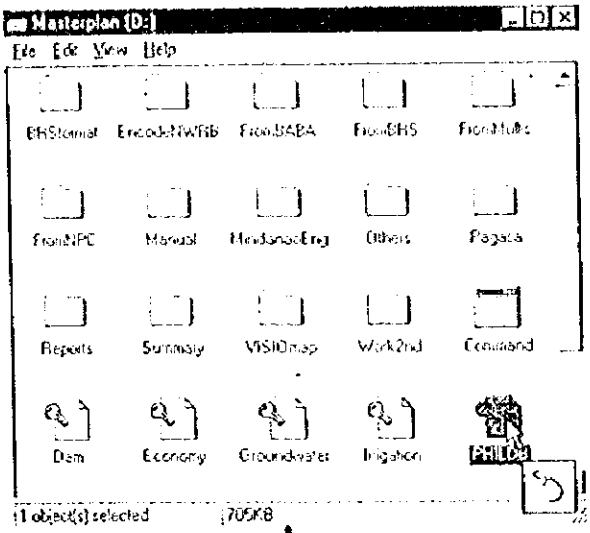
 **: Check Box**

Use as a stand-alone control bound to a Yes/No field, an unbound control for accepting user input in a custom dialog box, or part of an option group.

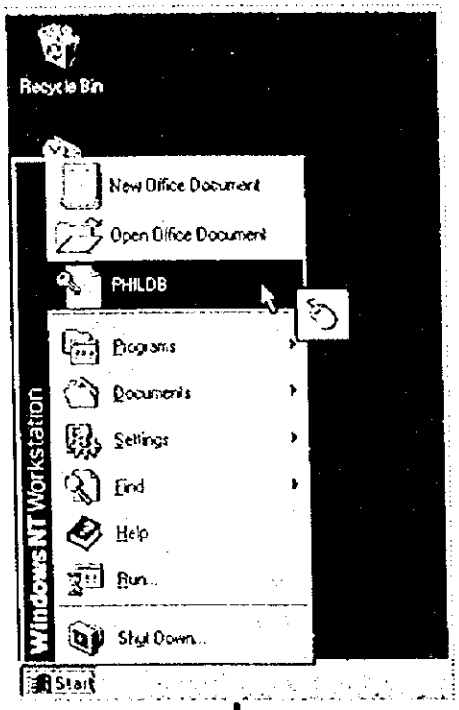
 **: Command Button**

Use to perform actions, such as finding a record, printing a record, or applying a form filter.

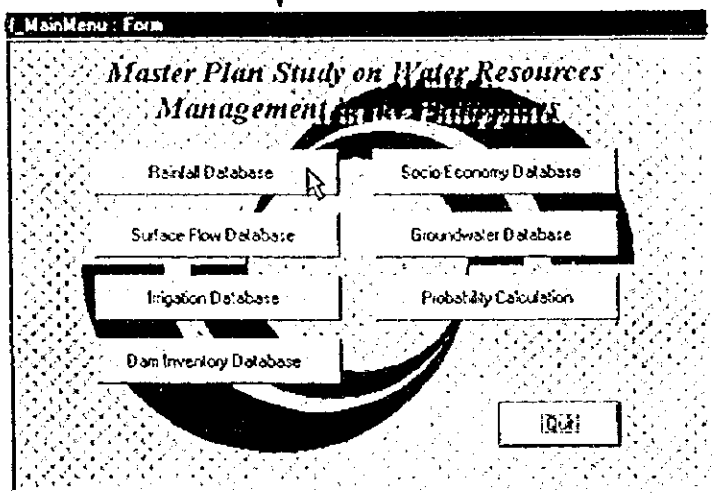
1.3 Starting PHILDB



On the window of hard disk drive which was placed PHILDB, double-click the icon.



Click the Start Button, and then click 'PHILDB'.



On the window (called main menu) that appears, you can start to use each database by clicking Command Button.

Chapter 2

Rainfall Database

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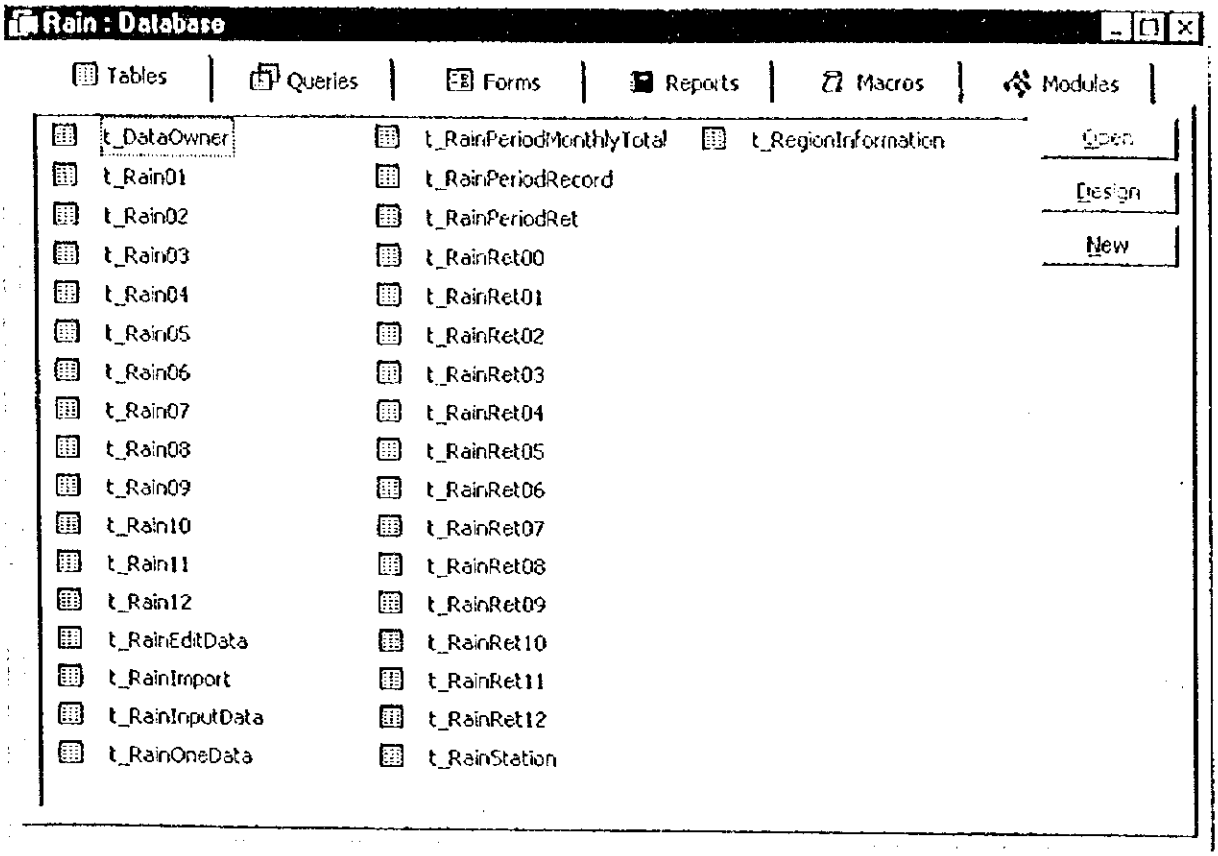
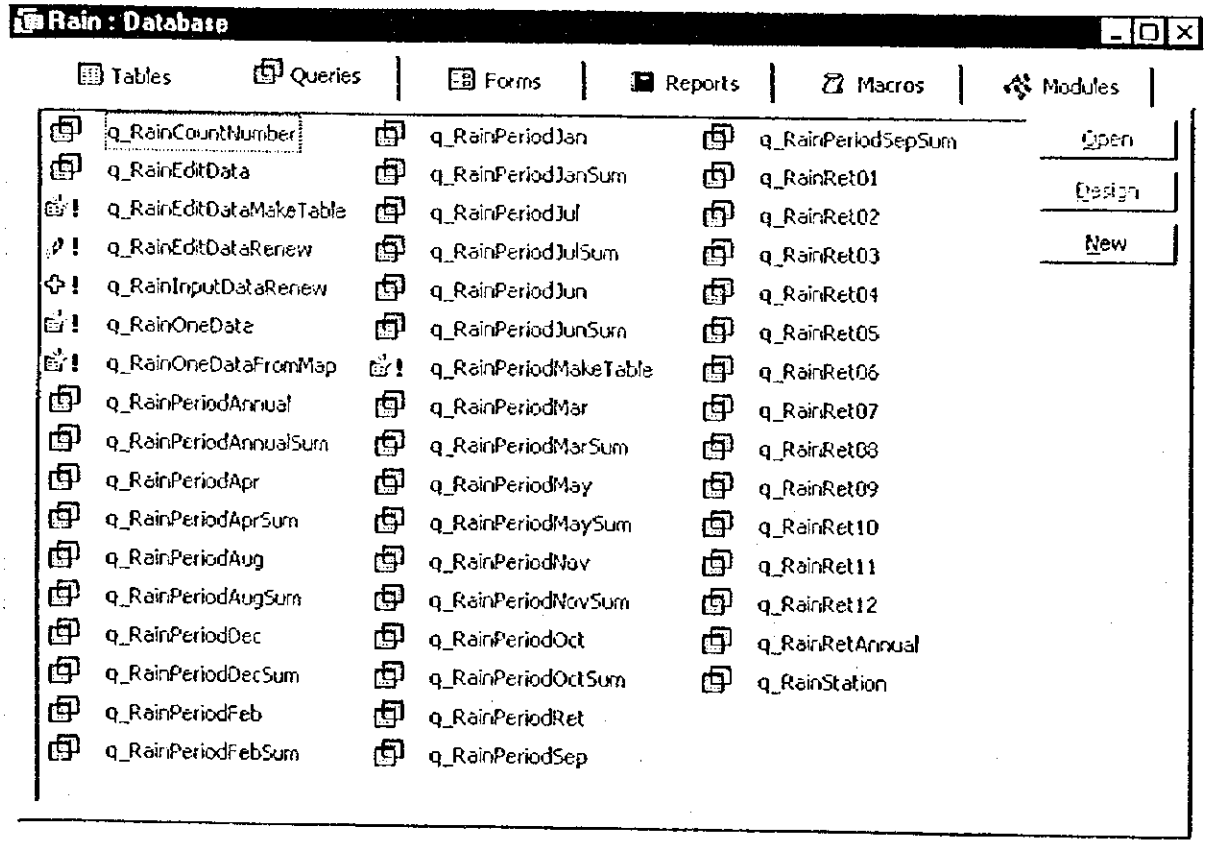
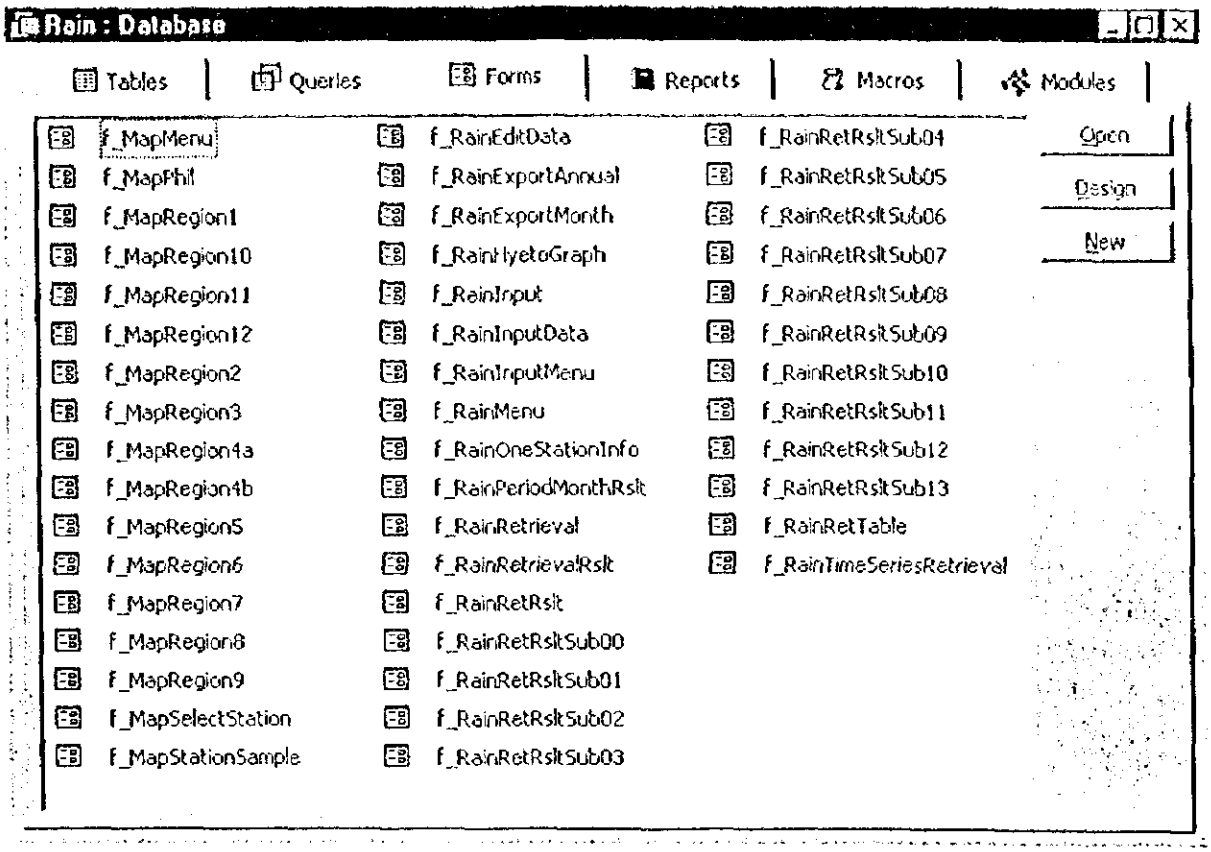
2.1 Database Components






Rain : Database
Tables
Queries
Forms
Reports
Macros
Modules
f_MapMenu
f_MapPhil
f_MapRegion1
f_MapRegion10
f_MapRegion11
f_MapRegion12
f_MapRegion2
f_MapRegion3
f_MapRegion4a
f_MapRegion4b
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f_RainRetRsltSub00
f_RainRetRsltSub01
f_RainRetRsltSub02
f_RainRetRsltSub03
f_RainRetRsltSub04
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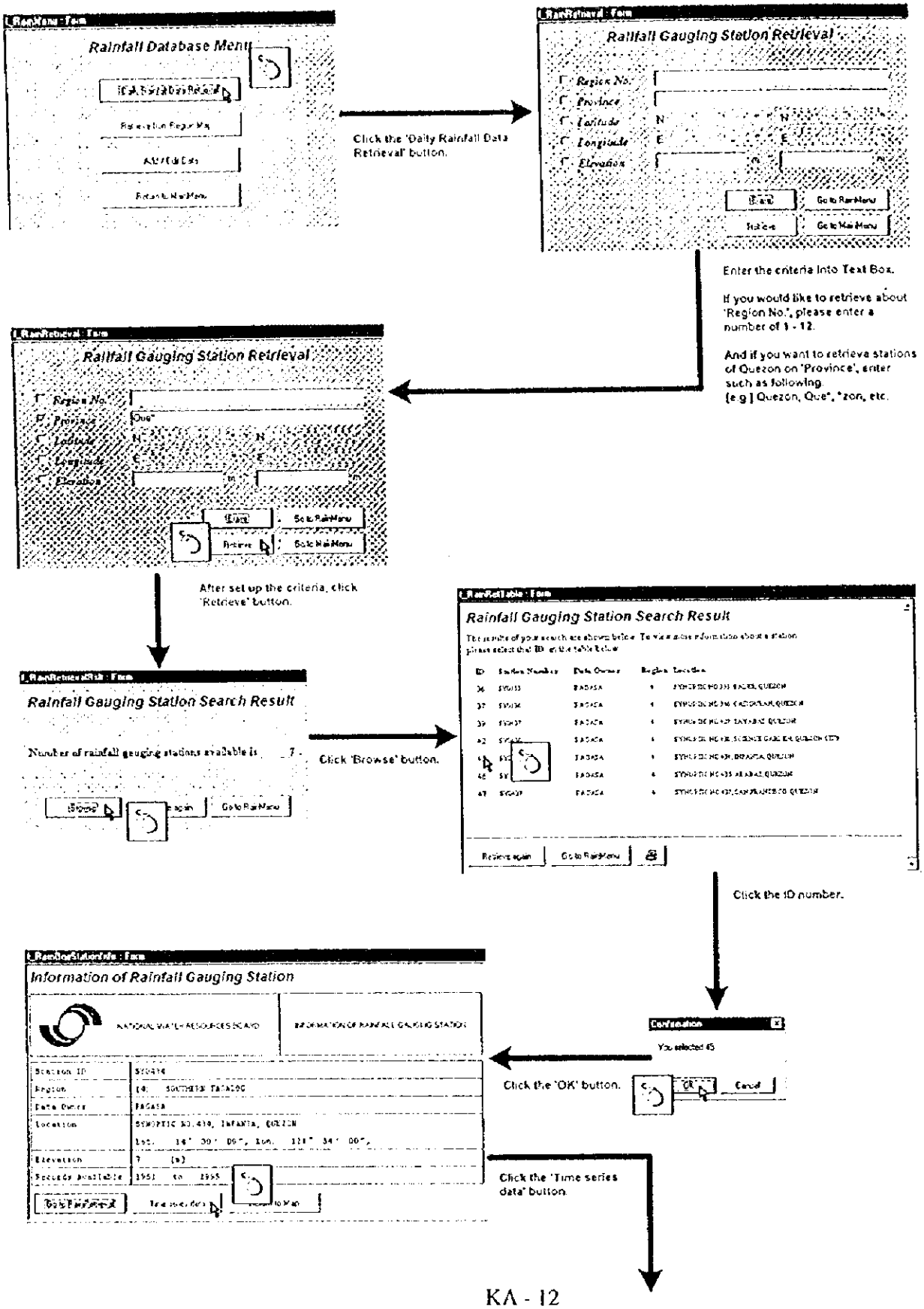
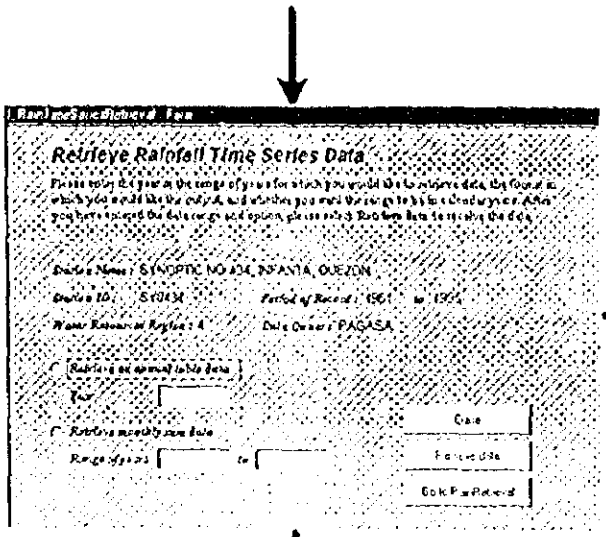
f_RainRetRsltSub11
f_RainRetRsltSub12
f_RainRetRsltSub13
f_RainRetTable
f_RainTimeSeriesRetrieval
Open
Design
New

2.2 Daily Rainfall Data

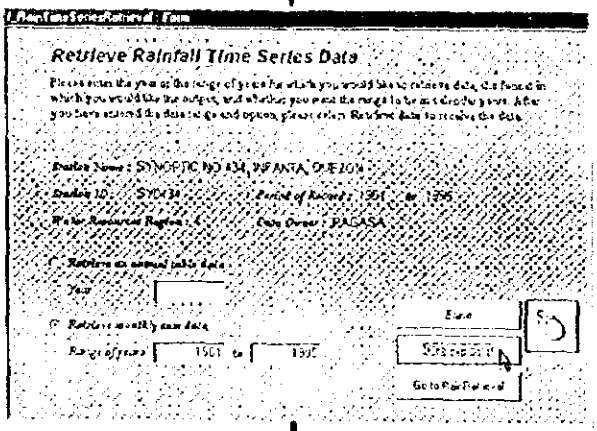
2.2.1 How to Retrieve

1) Using Retrieval Menu

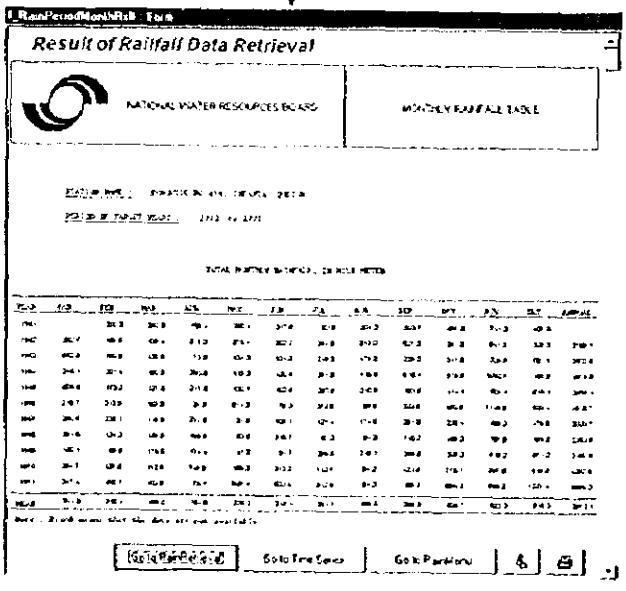




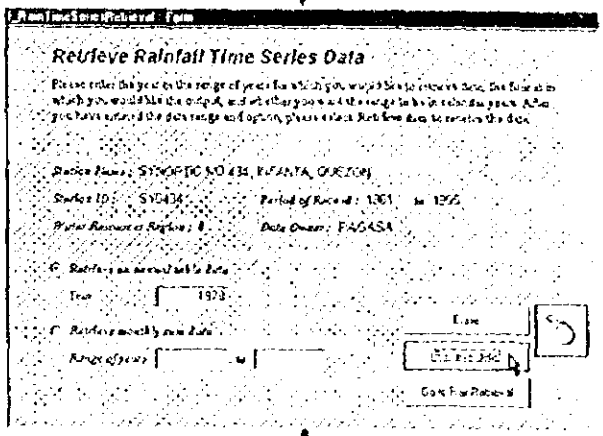
If you want monthly data, enter the period into the Text Box of 'Range of years'.



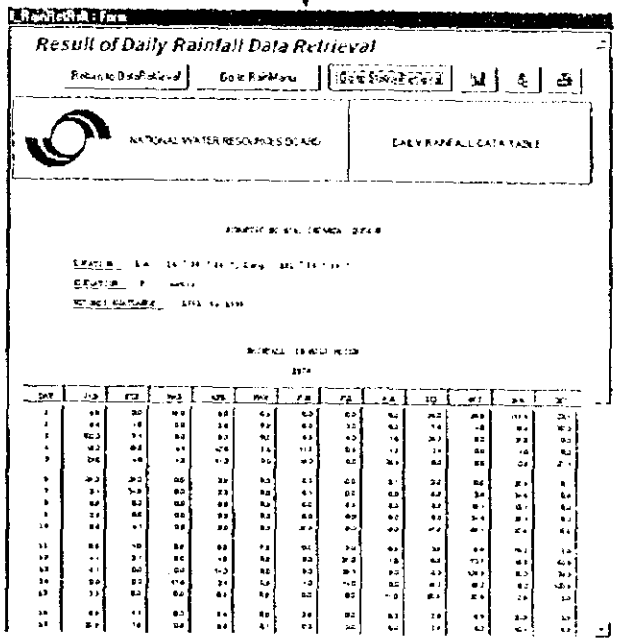
Click 'Retrieve data' button.



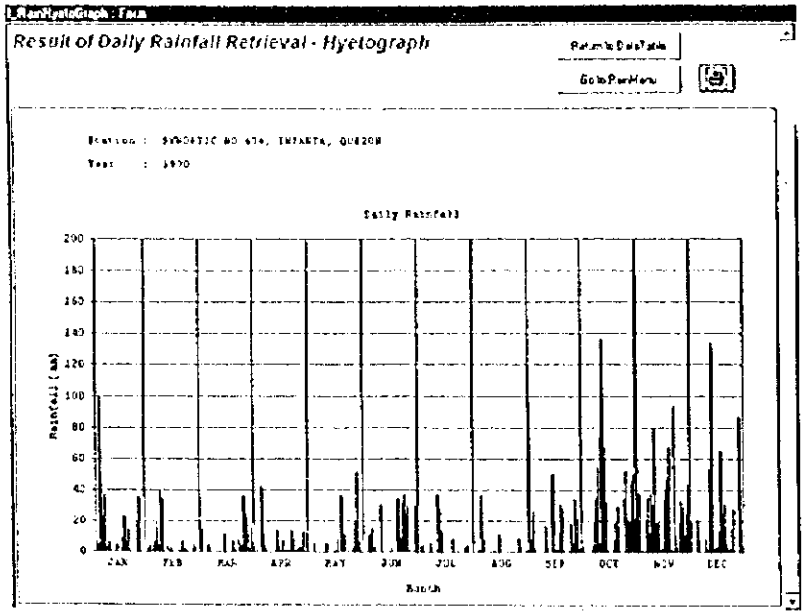
If you need daily data, enter the year into the Text Box of 'Year'.



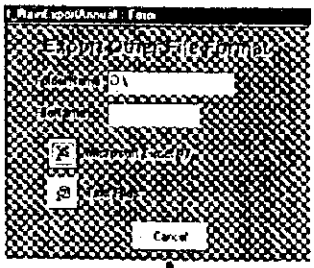
Click 'Retrieve data' button.



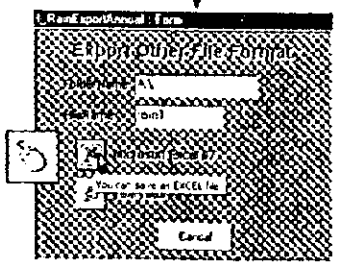
On the form of search result, you can get annual hyetograph when you click this (DrawGraph) button.

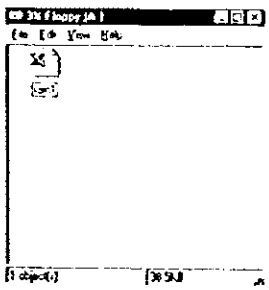


On the forms of search result, you can export to other file format when you click this (ExportData) button.



Enter the file name and folder (directory) which you want to place.

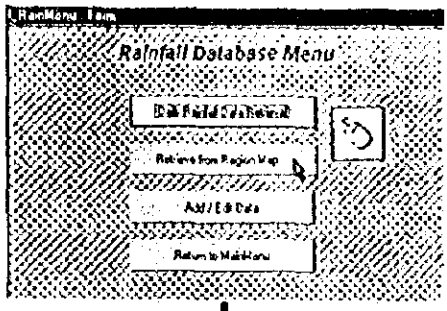




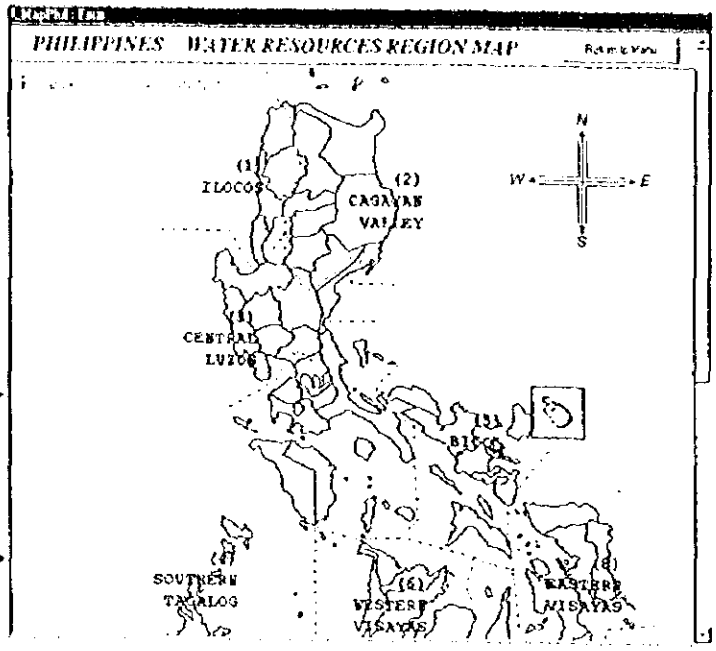
When you want to be exported by the name, rain1, in the A drive, it inputs like this example.

Insert the diskette into floppy drive, and then click a button of file format which you want to export.

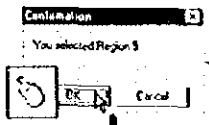
2) Using Retrieval Map



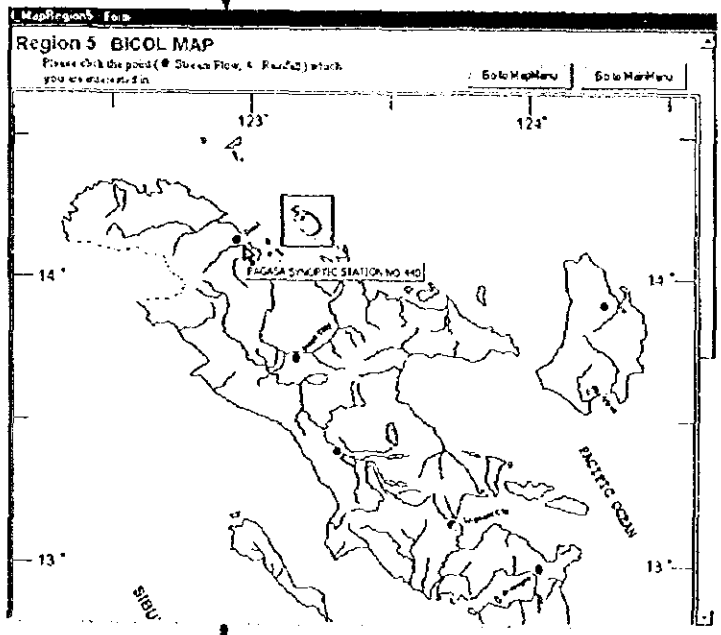
Click the 'Retrieve from Region Map' button.



Click a region name (blue character).

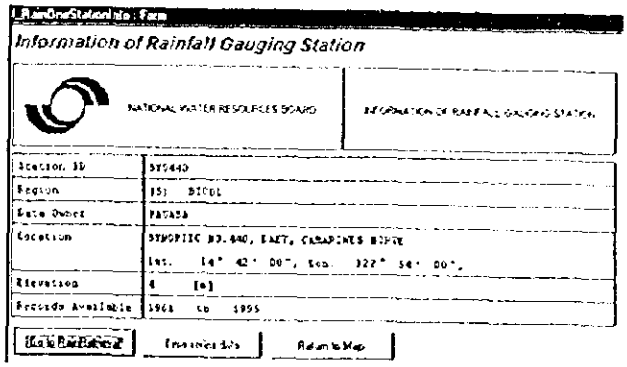


Click 'OK' button.



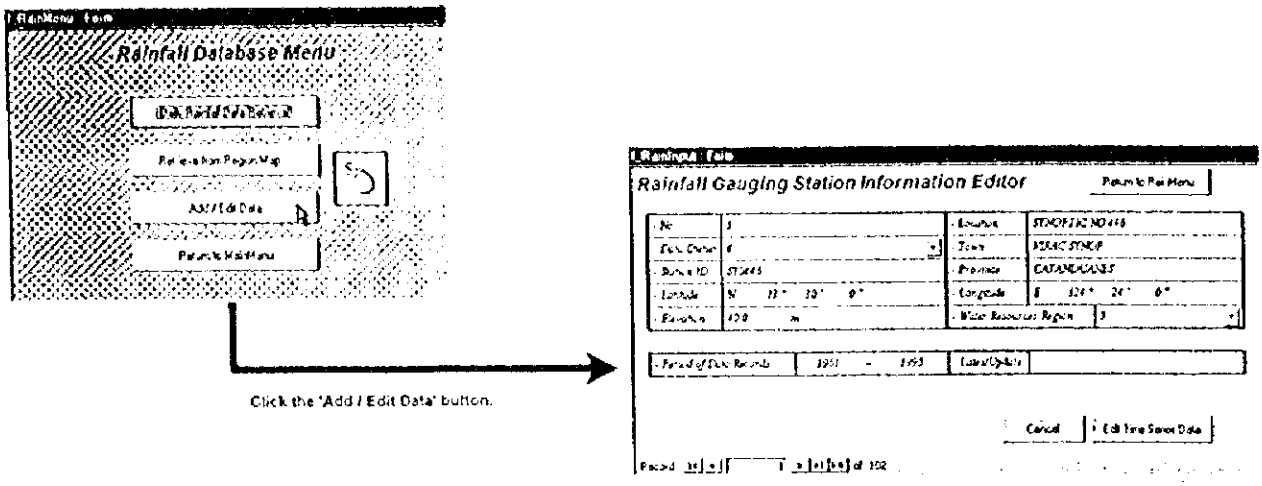
Click a rainfall gauging station button (light blue color).

Streamflow gauging station button (red color) is not available when you are searching a station for rainfall data.

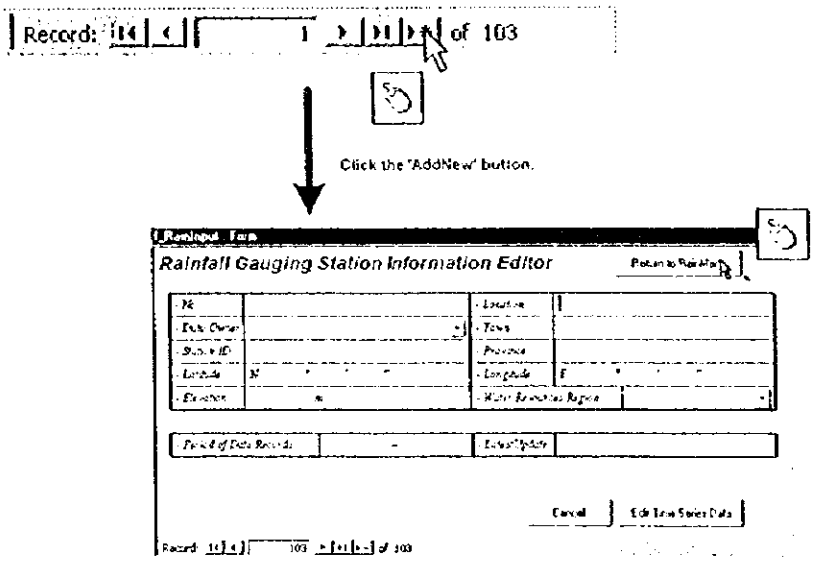


After this, you are possible to advance in the way of "1) Using Retrieval Menu"

2.2.2 How to Add / Edit



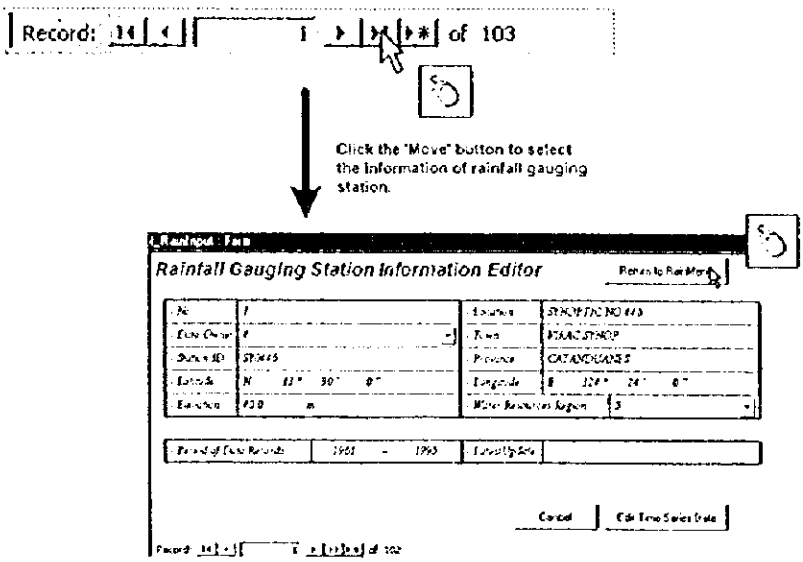
1) Add New Information of Rainfall Gauging Station



Enter the information of rainfall gauging station such as Location, Town, Province, Data Owner, StationID, Latitude, Longitude, Elevation, Water Resources Region.

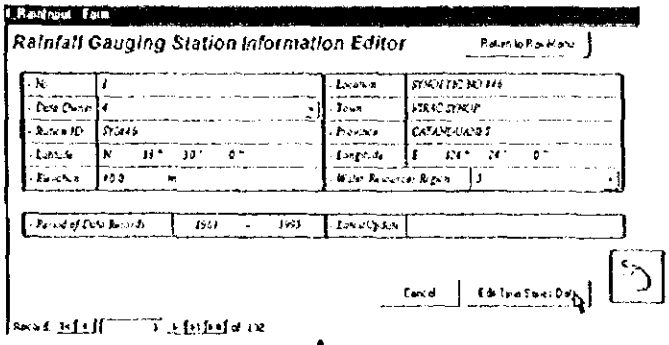
After that, click 'Return to RainMenu' button.

2) Edit the Information of Rainfall Gauging Station

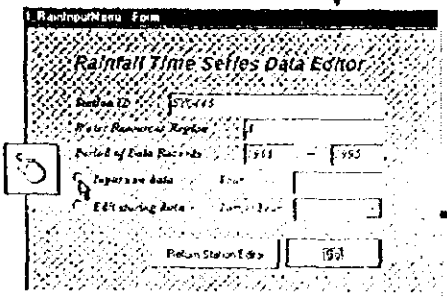


Enter the information which you want to edit, and then click 'Return to RainMenu' button.

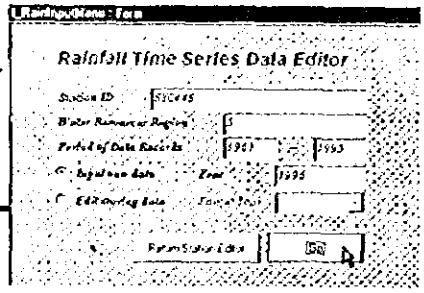
3) Add New Daily Rainfall Data



On the rainfall gauging station which you want to add data, click the 'Edit Time Series Data' button.



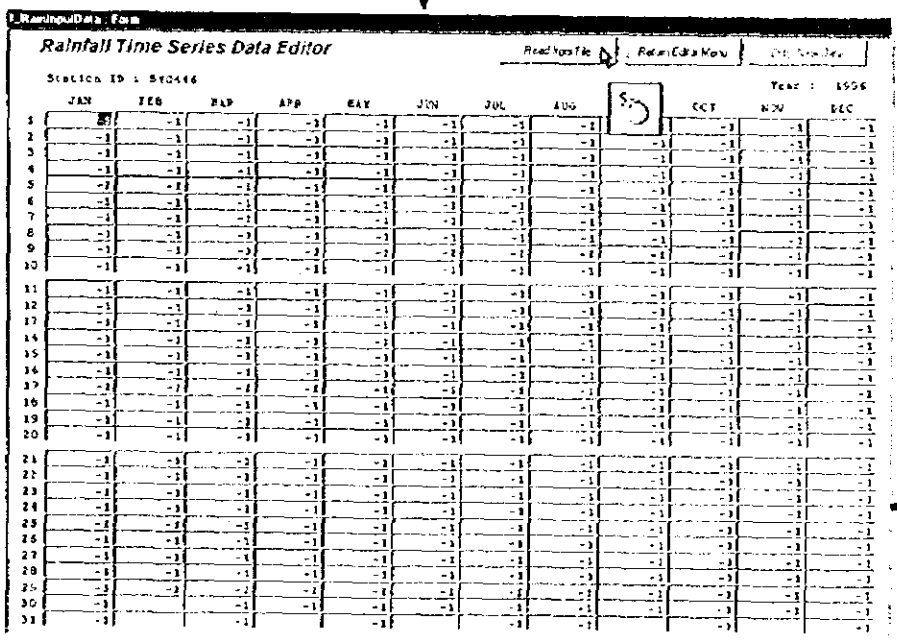
Click the Option Button of 'Input new data'.



Enter the year into Text Box of 'Year'.

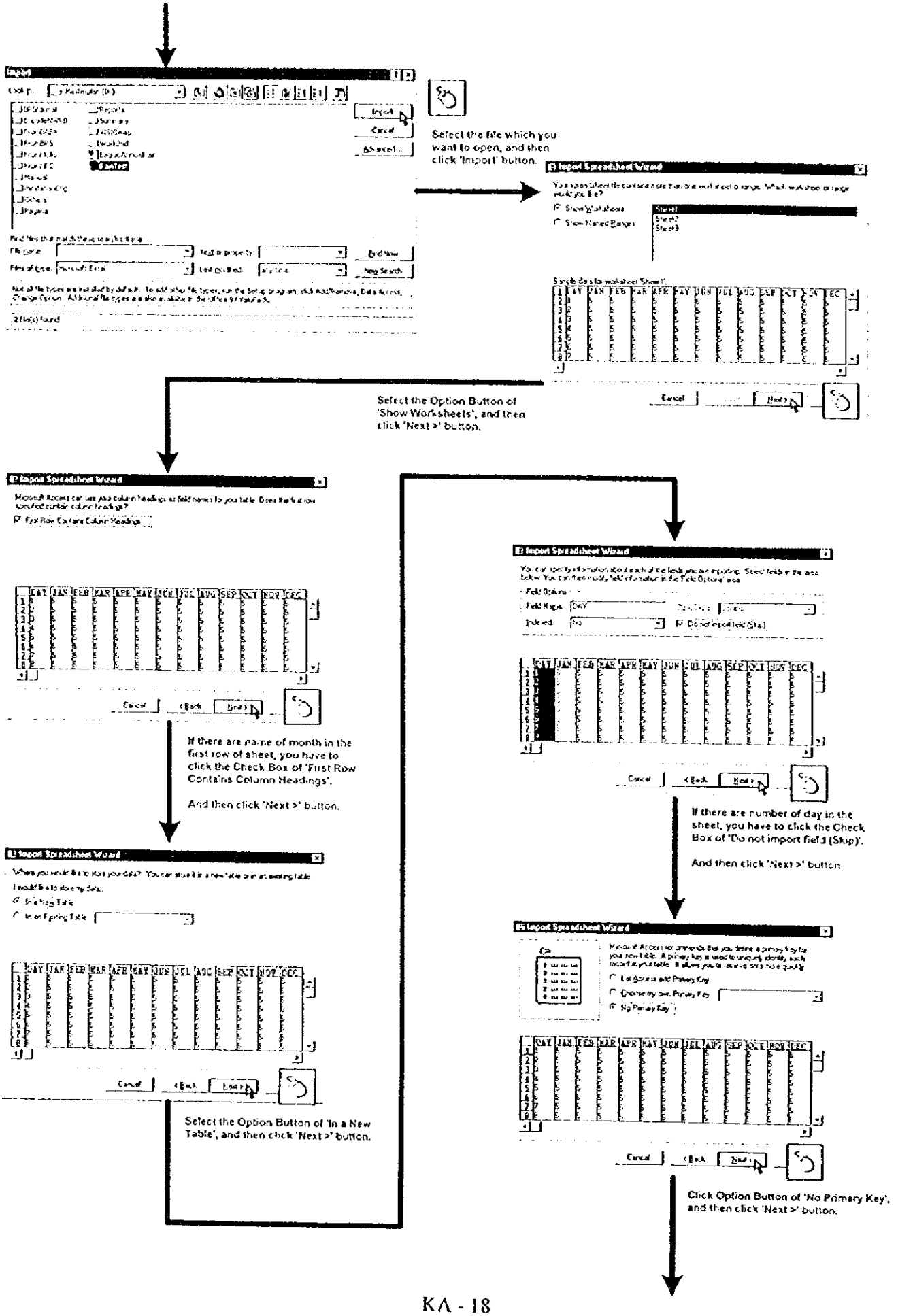
However you can enter the immediately previous or next year of data records. *For example, if period of data records* is 1961-1995, '1960' and '1996' are available.

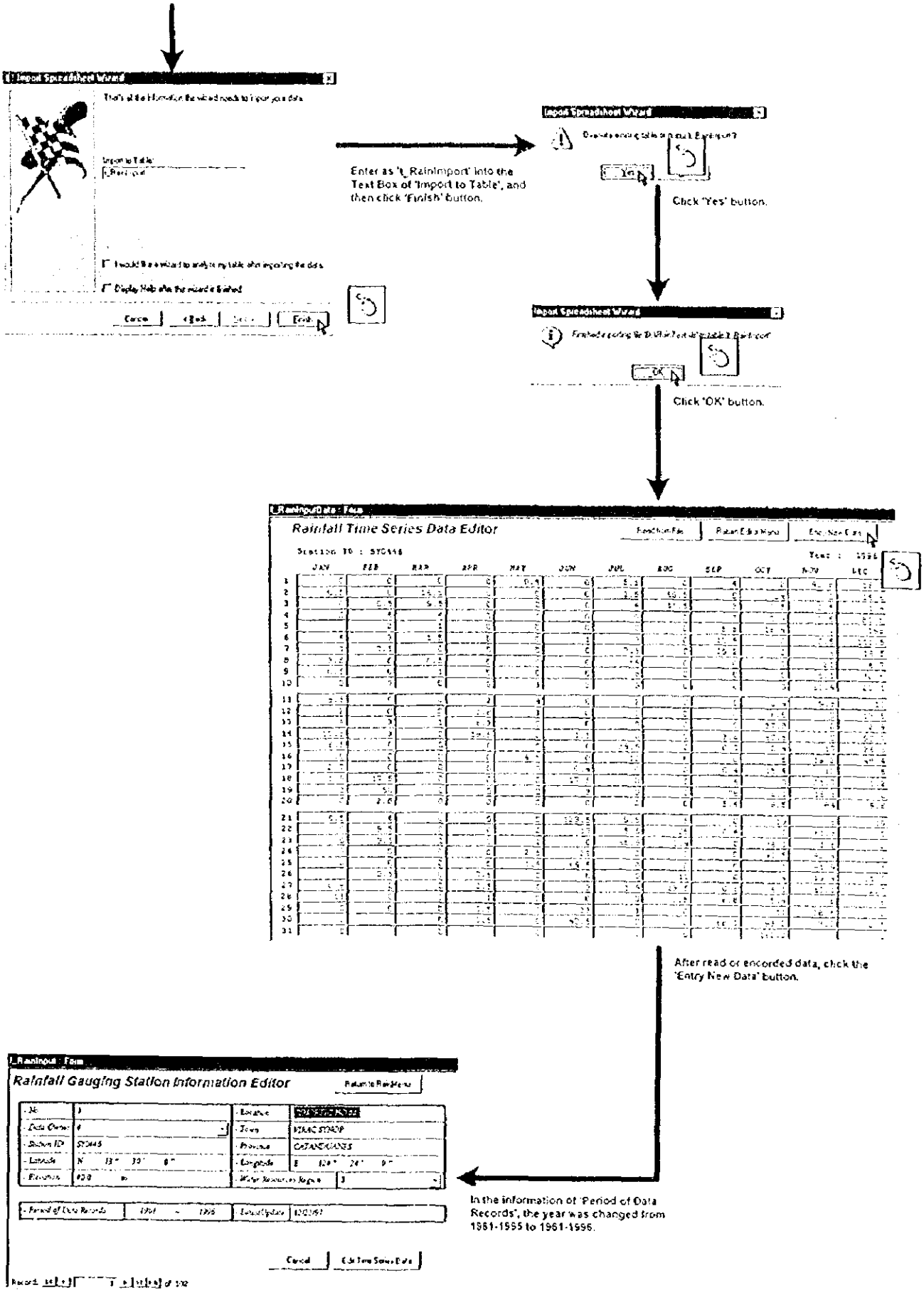
And then click 'Go' button.



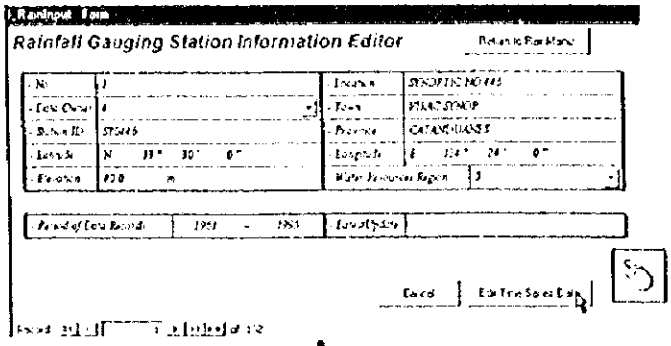
Enter the daily rainfall data. When you encoded data, it will change to the red character.

If you want to read data from other file, click the 'Read from File' button.

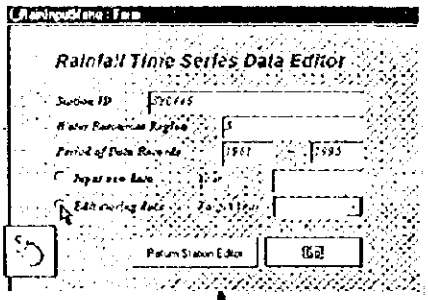

Select the file which you want to open, and then click 'Import' button.
Select the Option Button of 'Show Worksheets', and then click 'Next >' button.
If there are name of month in the first row of sheet, you have to click the Check Box of 'First Row Contains Column Headings'.
And then click 'Next >' button.
If there are number of day in the sheet, you have to click the Check Box of 'Do not import field (Skip)'.
And then click 'Next >' button.
Select the Option Button of 'In a New Table', and then click 'Next >' button.
Click Option Button of 'No Primary Key', and then click 'Next >' button.


Enter as 't_RainImport' into the Text Box of 'Import to Table', and then click 'Finish' button.
Click 'Yes' button.
Click 'OK' button.
Rainfall Time Series Data Editor
After read or encorded data, click the 'Entry New Data' button.
Rainfall Gauging Station Information Editor
In the information of 'Period of Data Records', the year was changed from 1981-1995 to 1961-1996.

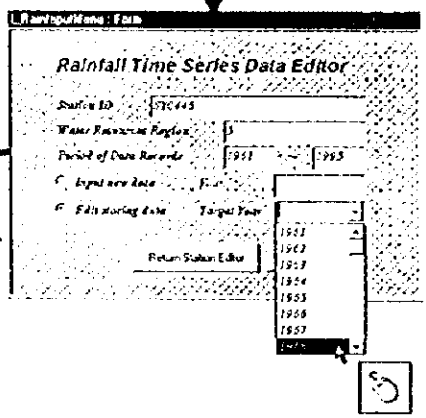
4) Edit Daily Rainfall Data



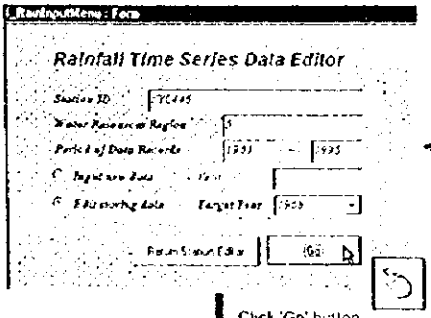
Click the 'Edit Time Series Data' button.



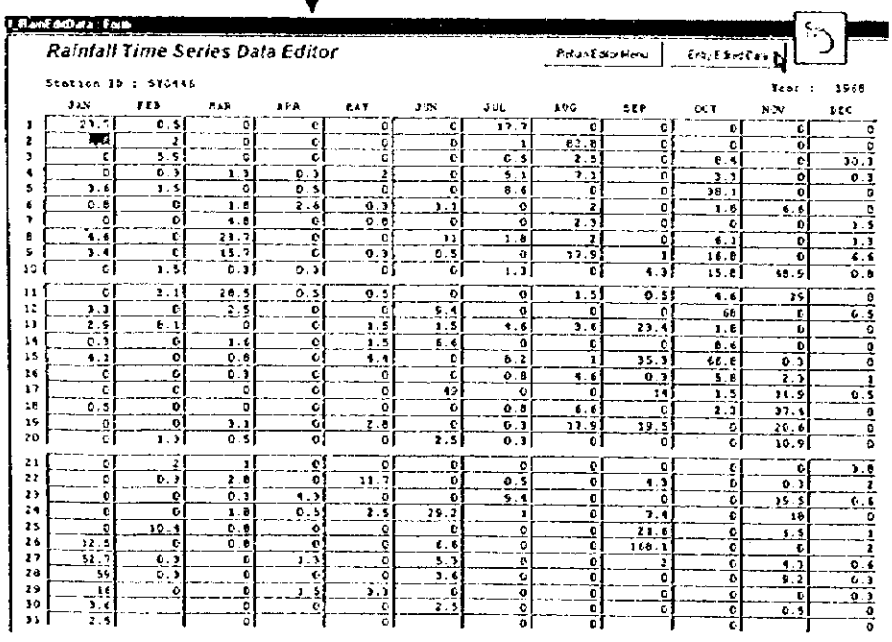
Click the Option Button of 'Edit storing data'.



Click the right edge of Combo Box of 'Target Year', and then click a year which you want to edit.



Click 'Go' button.

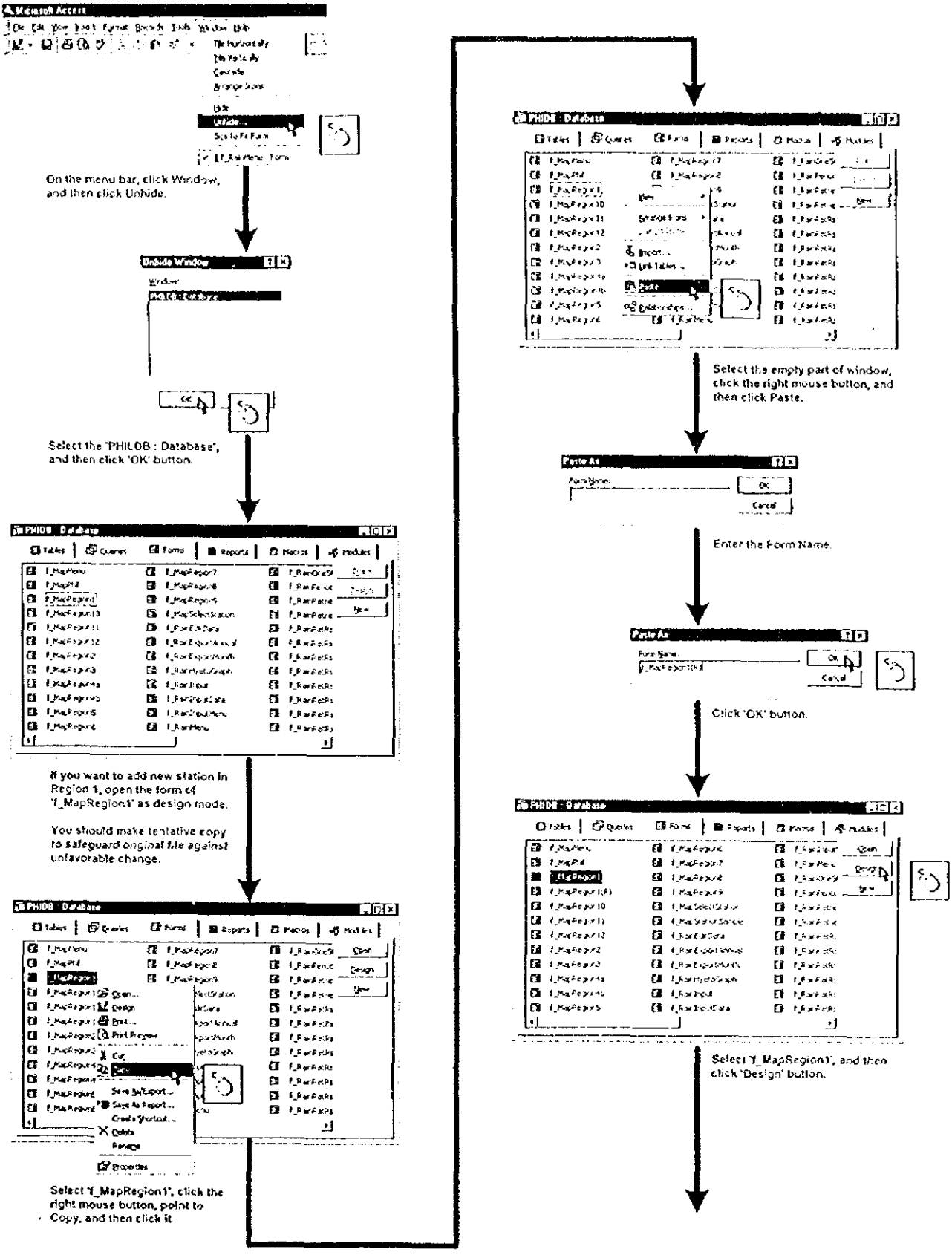


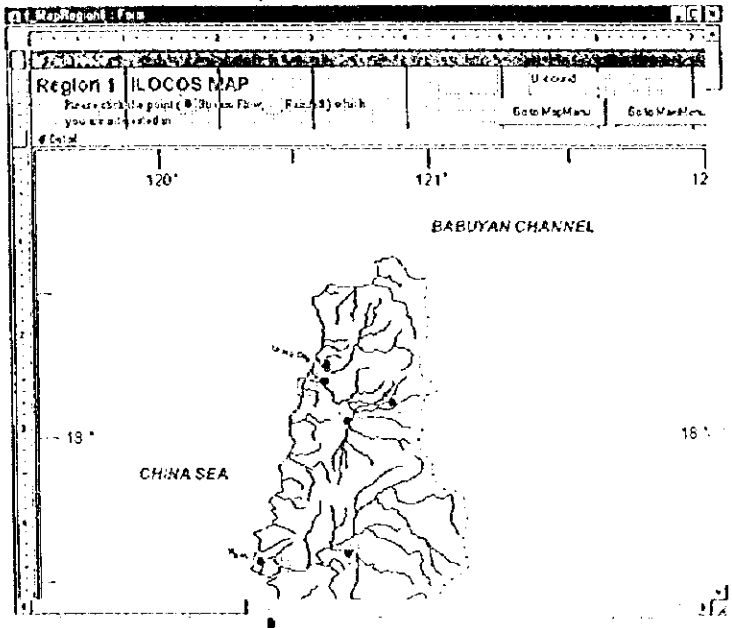
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	23.7	0.5	0	0	0	0	17.7	0	0	0	0	0
2	[illegible]	2	0	0	0	0	1	82.8	0	0	0	0
3	0	5.5	0	0	0	0	0.5	2.5	0	8.4	0	30.3
4	0	0.3	1.3	0.3	2	0	5.1	7.1	0	3.3	0	0.3
5	3.6	1.5	0	0.5	0	0	8.6	0	0	38.1	0	0
6	0.8	0	1.8	2.6	0.3	3.1	0	2	0	1.6	6.6	0
7	0	0	4.8	0	0.8	0	0	2.3	0	0	0	1.5
8	4.6	0	23.7	0	0	11	1.8	2	0	6.1	0	1.3
9	3.4	0	15.7	0	0.3	0.5	0	17.9	1	16.8	0	6.6
10	0	1.5	0.3	0.3	0	0	1.3	0	4.3	15.8	58.5	0.8
11	0	2.1	20.5	0.5	0.5	0	0	1.5	0.5	4.6	25	0
12	3.3	0	2.5	0	0	6.4	0	0	0	66	1	6.5
13	2.5	6.1	0	0	1.5	1.5	4.6	3.6	23.4	1.8	0	0
14	0.3	0	1.6	0	1.5	6.6	0	0	0	8.4	0	0
15	4.2	0	0.8	0	4.4	0	6.2	1	35.3	66.6	0.3	0
16	0	0	0.3	0	0	0	0.8	4.6	0.3	5.8	2.3	1
17	0	0	0	0	0	49	0	0	14	1.5	31.5	0.5
18	0.5	0	0	0	0	0	0.8	6.6	0	2.3	37.5	0
19	0	0	3.3	0	2.8	0	0.3	17.9	19.5	0	20.6	0
20	0	1.3	0.5	0	0	2.5	0.3	0	0	0	10.9	0
21	0	2	1	0	0	0	0	0	0	0	0	3.8
22	0	0.3	2.8	0	11.7	0	0.5	0	4.3	0	0.3	2
23	0	0	0.3	4.3	0	0	5.4	0	0	0	35.5	0.6
24	0	0	3.8	0.5	2.5	29.2	1	0	2.4	0	10	0
25	0	10.5	0.8	0	0	0	0	0	21.6	0	5.5	1
26	32.5	0	0.8	0	0	6.6	0	0	168.1	0	0	2
27	52.7	0.3	0	1.5	0	5.3	0	0	2	0	4.3	0.4
28	56	0.3	0	0	0	3.6	0	0	0	0	8.2	0.3
29	16	0	0	1.5	3.3	0	0	0	0	0	0	0.3
30	3.6		0	0	0	2.5	0	0	0	0	0.5	0
31	2.5		0		0		0	0		0		0

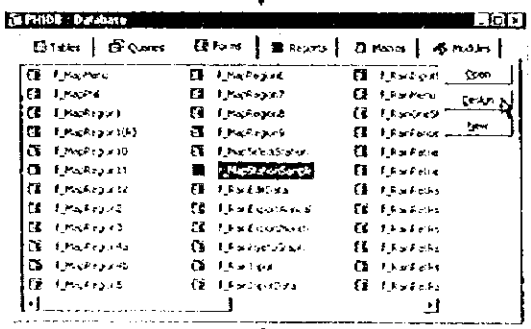
Edit daily rainfall data. Edited data will change to the red character.

After edited, click the 'Entry Edited Data' button.

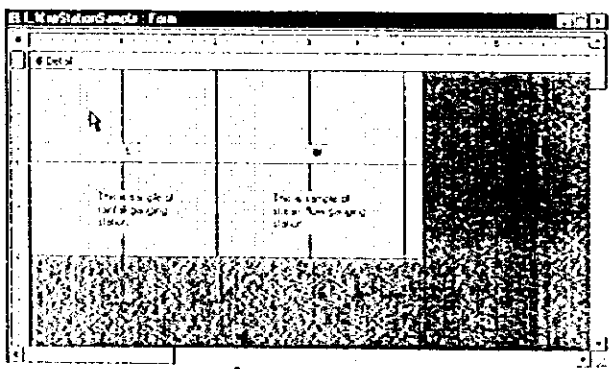
5) Add New Information of Rainfall Gauging Station on Regional Map



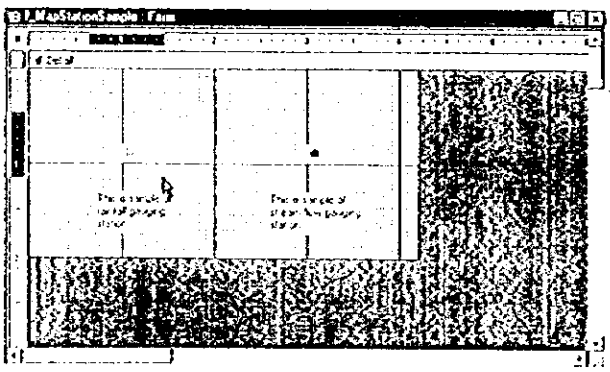




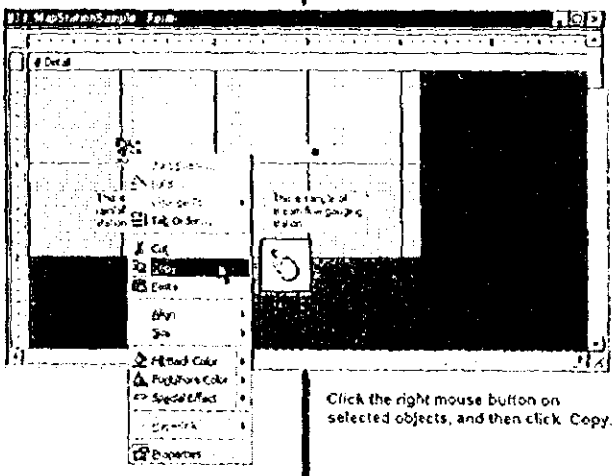
On the Database Window, select 'f_MapStationSample', and then click 'Design' button.



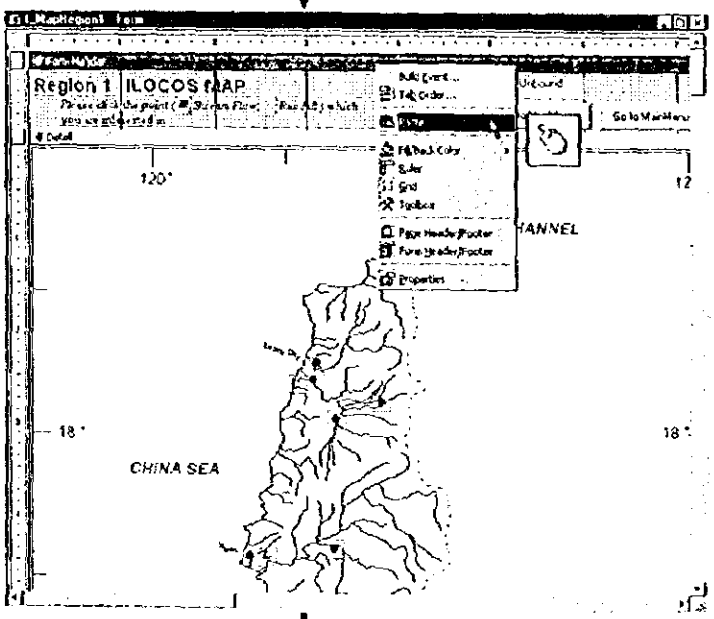
To select objects for rainfall gauging station, press and hold down the left mouse button, and point to where you want the objects.



And then release the mouse button.

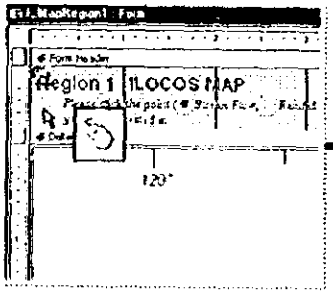


Click the right mouse button on selected objects, and then click Copy.

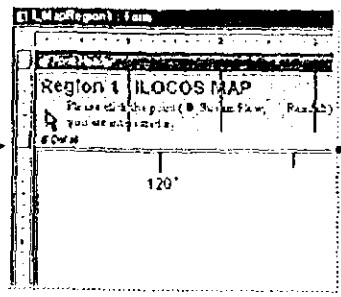


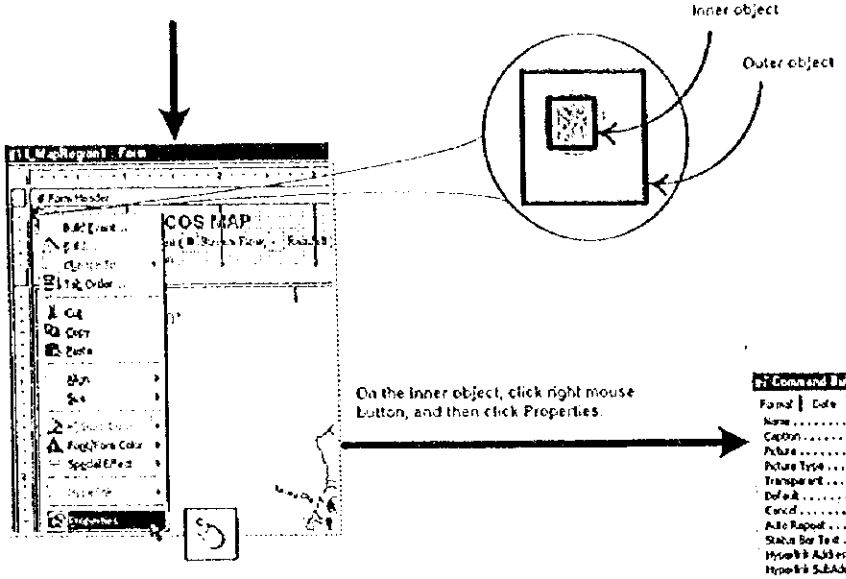
On the window of 'f_MapRegion1', select the Form Header, and click the right mouse button, and then click Paste.

The objects will appear in the upper left corner.

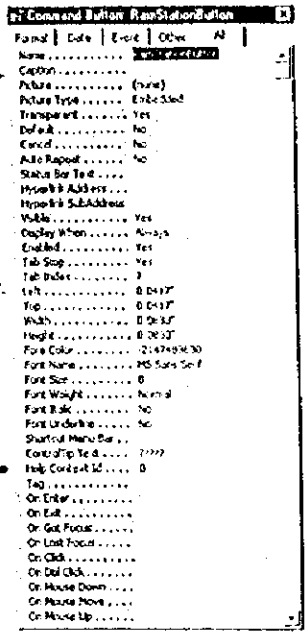


Click the empty part of window.





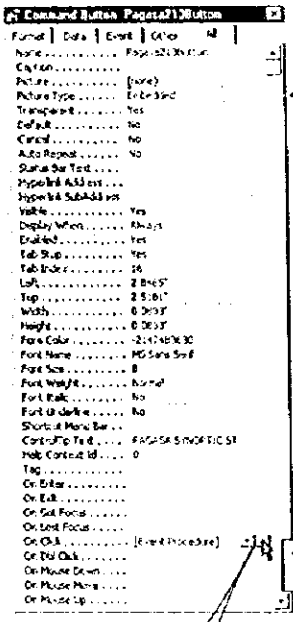
On the inner object, click right mouse button, and then click Properties.



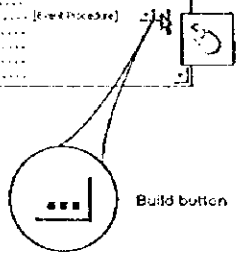
Put the object's name into Text Box of 'Name'.

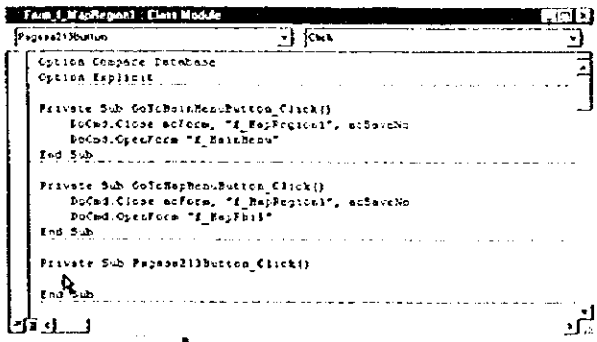
If the station which you want to add is PAGASA synoptic no. 213, you should put a unique name such as 'Pagasa213Button'.

And enter the location as follows into Text Box of 'ControlTip Text'.
[e.g.] PAGASA SYNOPTIC STATION NO 213



On the Combo Box of 'On Click', select the '[Event Procedure]', and then click 'Build' button.



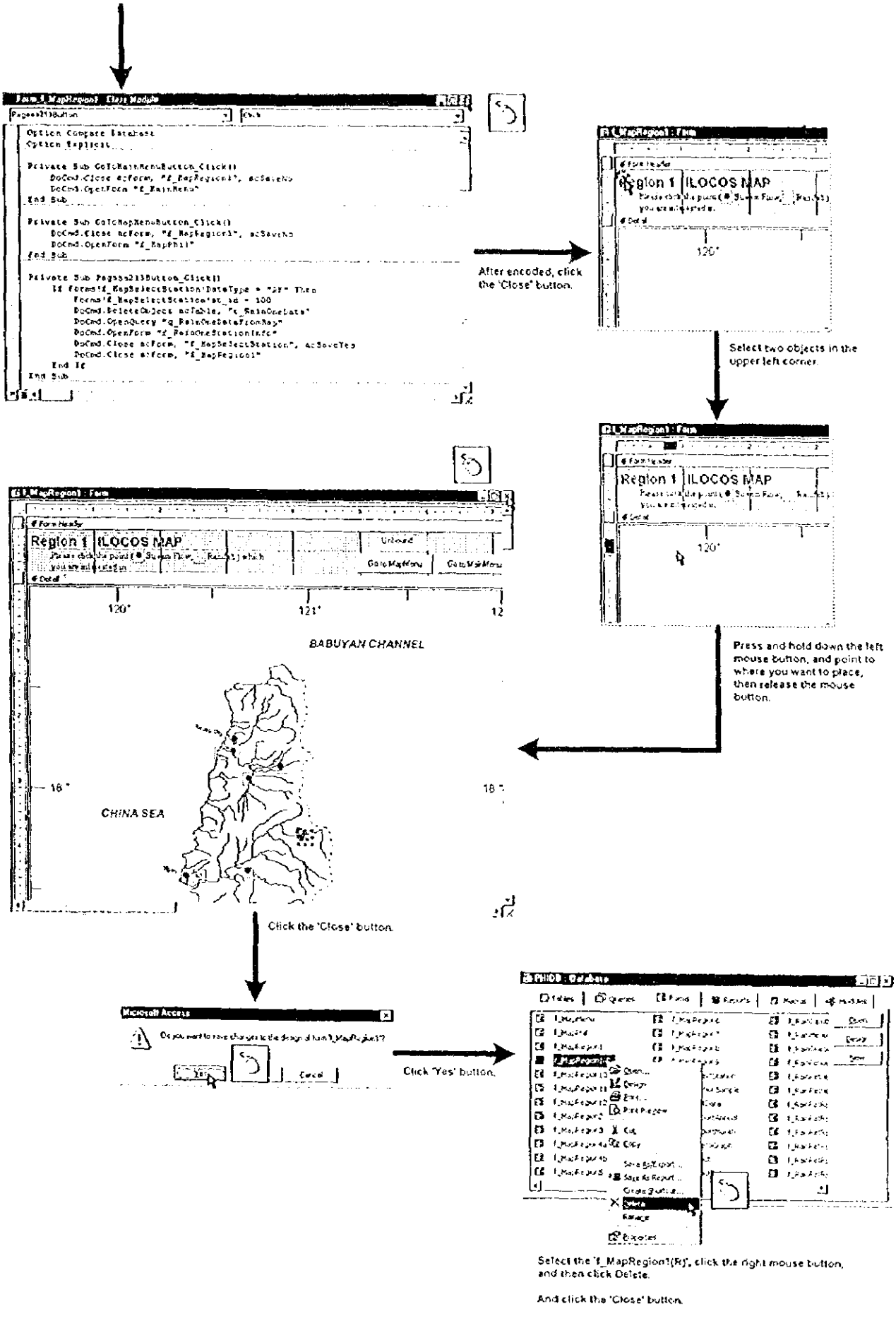


```
Private Sub Pagasa213Button_Click()
    If Forms!f_MapSelectStation!DataType = "RF" Then
        Forms!f_MapSelectStation!st_id = 100
        DoCmd.DeleteObject acTable, "t_RainOneData"
        DoCmd.OpenQuery "q_RainOneDataFromMap"
        DoCmd.OpenForm "f_RainOneStationInfo"
        DoCmd.Close acForm, "f_MapSelectStation", acSaveYes
        DoCmd.Close acForm, "f_MapRegion1"
    End If
End Sub
```

On the Class Module, encode the left example.

In the 'st_id' of left example, you must put the number which was given in 'f_RainInput' (refer to page 13) because 'st_id' is corresponding to 'No' of 'f_RainInput'.

And if you are editing about region2, you must replace 'f_MapRegion1' with 'f_MapRegion2'.


After encoded, click the 'Close' button.
Region 1 ILOCOS MAP
120°
Select two objects in the upper left corner.
Region 1 ILOCOS MAP
120°
Press and hold down the left mouse button, and point to where you want to place, then release the mouse button.
Region 1 ILOCOS MAP
120°
121°
BABUYAN CHANNEL
18°
CHINA SEA
Click the 'Close' button.
Click 'Yes' button.
Select the 'f_MapRegion1(R)', click the right mouse button, and then click Delete.
And click the 'Close' button.

2.3 Output Samples

1) Monthly Rainfall Data Table

NATIONAL WATER RESOURCES BOARD

MONTHLY RAINFALL TABLE

STATION NAME : SYNOPTIC NO.328, BAGUIO CITY, BENGUET

PERIOD OF TARGET YEARS : 1961 to 1995

TOTAL MONTHLY RAINFALL, IN MILI METER

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1961	15.0	0.0	119.8	63.0	189.9	575.1	1025.6	815.8	565.5	196.8	72.1	7.6	3442.0
1962	3.3	0.0	9.2	92.9	264.0	185.1	1248.3	694.4	832.7	154.3	29.6	7.9	3522.7
1963	9.8	4.3	9.8	7.8	125.5	1092.5	489.8	383.8	1457.9	76.2	61.6	46.1	3745.0
1964	3.2	0.8	18.9	158.4	233.1	520.4	299.9	1571.9	572.3	443.7	202.8	143.6	4469.1
1965	2.6	22.4	118.6	290.1	459.9	503.3	732.6	371.3	364.8	106.6	24.5	0.0	2556.7
1966	15.6	8.9	45.3	26.8	764.3	241.8	374.3	601.6	956.7	60.1	175.4	37.1	3310.1
1967	1.8	4.6	12.1	230.9	197.9	1417.9	323.8	1141.1	443.3	1560.3	109.1	0.8	5443.6
1968	4.2	0.0	6.4	53.4	275.5	346.7	1043.7	1672.3	1450.8	31.2	18.6	0.0	4930.8
1969		0.8	7.2	85.9	344.0	352.3	1211.8	616.3	834.9	279.1	52.0	48.6	
1970	21.2	2.9	21.3	68.8	343.6	417.4	405.9	878.8	818.0	974.5	85.4	50.8	3561.6
1971	12.7	12.1	4.2	144.4	162.6	489.6	1321.1	756.6	385.5	306.4	66.7	46.8	3708.7
1972	18.8	1.8	12.3	83.2	328.3	455.4	4773.8	1043.8	331.5	50.9	48.5	25.6	7165.8
1973	0.6	0.0	1.1	51.5	106.2	372.5	418.7	537.4	225.2	816.2	54.4	13.5	2597.3
1974	20.9	0.0	7.4	97.2	272.4	549.7	389.5	1497.5	332.6	2273.5	638.1	48.2	6114.5
1975	17.1	0.0	2.3	57.9	215.2	224.4	152.5	787.9	477.4	295.5	27.5	43.1	2300.8
1976	21.6	0.0	38.7	21.4	1304.5	1224.8	377.3	672.0	373.0	176.3	81.5	7.5	4303.6
1977	30.2	0.0	5.9	30.8	264.8	159.3	694.5	784.2	1281.4	148.6	186.6	0.0	3616.5
1978	0.0	0.0	5.8	64.8	265.9	431.4	813.4	1412.9	583.9	344.8	20.0	29.7	3772.4
1979	13.0	1.4	1.4	117.1	410.1	239.1	586.7	1078.4	250.2	206.2	20.7	48.1	2972.4
1980	1.0	1.9	16.6	4.8	1040.4	68.3	1323.3	237.6	562.2	210.8	885.0	35.4	4407.5
1981	38.5	2.9	0.0	263.2	248.2	628.5	455.2	1165.6	634.7	196.3	206.4		
1982	0.5	22.7	21.5	168.2	228.9	340.0	1146.8	921.4	443.6	238.2	123.8	47.3	3702.9
1983	43.4	15.4	10.4	0.0	95.6	202.9	279.3	933.0	391.7	176.4	72.2	0.8	2218.1
1984	13.6	0.0	54.8	209.5	525.6	442.4	286.1	1512.5	397.7	322.4	17.3	2.3	3781.2
1985	7.4	46.0	57.5	219.7	410.7	1540.7	189.5	1424.8	512.1	265.2	76.3	15.4	4765.1
1986	18.2	11.0	8.7	3.6	531.1	226.4	1495.7	1208.1	1030.2	146.6	49.5	17.9	4737.0
1987	0.0	0.0	8.2	29.4	234.5	381.6	304.6	814.7	413.9	503.5	9.5	27.7	2727.6
1988	14.6	36.9	0.1	119.5	306.4	546.5	828.6	240.7	312.1	451.0	23.4	3.4	2983.2
1989	50.2	64.3	113.0	51.2	334.5	343.5	1506.8	506.0	1539.0	355.1	106.5	0.2	4970.1
1990	0.0	0.0	6.9	15.7	348.9	1088.1	565.0	1599.9	861.5	309.5	51.5	8.5	4873.5
1991	0.0		10.6	125.6	124.0	177.8	586.4	877.2	593.8	1735.3	15.5	1.2	
1992	8.1	0.4	87.8	23.6	483.2	317.6	473.4	1403.8	1611.5	818.5	21.0	0.6	4530.5
1993	2.0	3.6	4.0	88.4	37.8	1024.3	410.9	431.9	492.0	586.6	172.4	25.7	3277.6
1994	23.1	5.0	64.6	103.5	353.4	193.1	1191.2	723.7	178.4	816.4	9.7	3.7	2993.8
1995	0.0	4.4	0.0	32.3	227.2	951.1	470.3	704.7	288.9	139.1	102.2	59.7	2180.4
MEAN	12.6	8.0	26.3	88.8	345.2	500.8	803.1	896.0	649.2	382.0	110.5	25.2	3847.2

Note : Blank means that the data are not available

2) Daily Rainfall Data Table

NATIONAL WATER RESOURCES BOARD

DAILY RAINFALL DATA TABLE

SYNOPTIC NO.328, BAGUIO CITY, BENGUET

LOCATION : Lat. 16 ° 30 ' 00 ", Long. 120 ° 36 ' 00 "

ELEVATION : meter

RECORDS AVAILABLE : 1961 to 1995

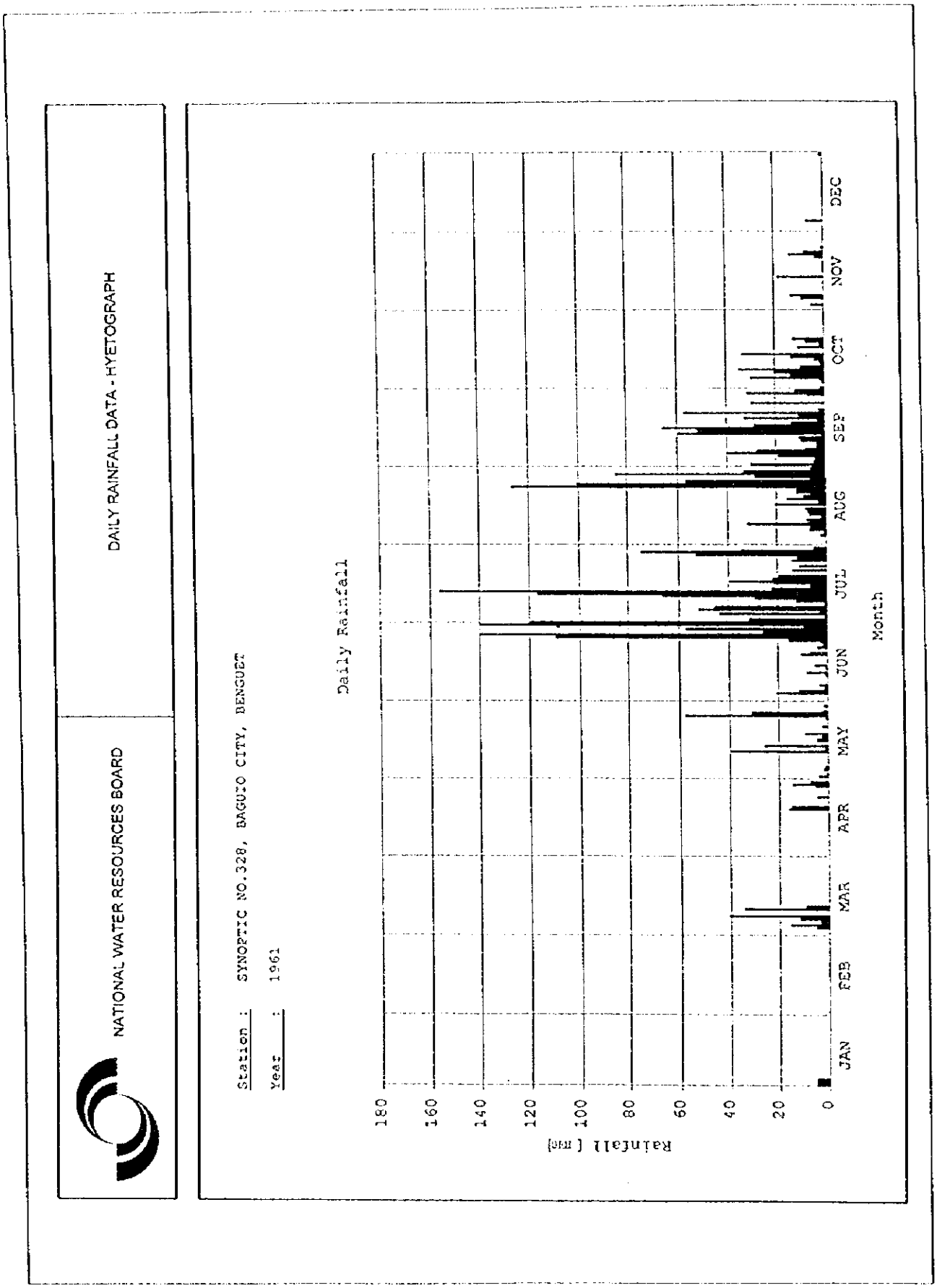
RAINFALL, IN MILI METER

1961

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	5.0	0.0	0.0	0.0	4.1	0.0	112.6	0.0	30.5	1.5	0.0	0.0
2	5.0	0.0	0.0	0.0	0.5	0.0	31.2	0.0	4.6	0.0	5.3	0.0
3	5.0	0.0	5.3	0.0	0.0	20.8	0.8	0.0	4.1	0.5	0.0	0.0
4	0.0	0.0	15.7	0.0	1.8	11.7	43.9	2.5	19.3	1.5	0.0	0.0
5	0.0	0.0	3.6	0.0	1.3	1.0	2.8	0.3	30.6	29.7	6.9	6.6
6	0.0	0.0	11.7	0.0	0.0	3.1	52.3	6.5	27.2	13.2	13.7	0.0
7	0.0	0.0	43.1	0.0	0.0	0.0	45.5	6.1	7.9	20.3	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.6	31.8	3.6	34.3	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	12.4	8.8	3.3	9.7	0.0	0.0
10	0.0	0.0	34.0	0.0	0.0	0.3	29.0	7.6	9.7	1.0	0.0	0.0
11	0.0	0.0	9.4	0.0	39.4	8.6	66.3	1.0	13.7	1.5	0.0	0.0
12	0.0	0.0	0.0	0.0	1.0	0.0	116.5	6.6	1.3	4.1	0.0	0.0
13	0.0	0.0	0.0	0.0	25.9	0.3	155.7	7.4	59.7	13.5	18.3	0.0
14	0.0	0.0	0.0	0.0	0.0	5.1	22.6	8.4	51.8	33.0	0.0	0.0
15	0.0	0.0	0.0	0.0	4.3	0.0	6.9	0.0	65.8	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	4.6	0.0	21.3	20.8	28.7	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	2.0	0.0	39.1	3.0	13.2	10.9	0.0	0.0
18	0.0	0.0	0.0	18.3	9.7	10.9	21.6	15.5	2.8	1.5	0.0	0.0
19	0.0	0.0	0.0	15.0	0.0	7.1	19.8	8.9	32.5	7.4	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	10.7	13.0	0.0	0.0
21	0.0	0.0	0.0	0.0	2.0	4.1	14.0	11.9	57.2	0.0	3.6	0.0
22	0.0	0.0	0.0	0.0	0.0	1.5	0.0	11.7	2.5	0.0	14.2	0.0
23	0.0	0.0	0.0	4.6	0.0	2.8	35.2	127.0	0.0	0.0	2.8	0.0
24	0.0	0.0	0.0	0.0	0.3	15.8	0.0	100.3	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	57.9	105.5	14.2	56.4	29.5	0.0	0.5	0.0
26	0.0	0.0	0.0	0.0	31.0	140.0	11.7	8.1	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	5.3	2.3	25.7	52.8	28.4	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	14.7	0.0	57.2	74.4	84.6	6.6	0.0	0.0	0.0
29	0.0		0.0	2.1	1.8	9.4	34.0	33.3	31.2	0.0	0.0	0.0
30	0.0		0.0	0.0	0.0	14.2	5.1	6.4	11.7	0.0	0.0	0.0
31	0.0		0.0		0.0		0.0	5.1		0.0		1.0
TOTAL	15.0	0.0	119.8	83.0	188.9	575.1	1025.5	611.8	565.5	196.6	72.5	7.6
MAX	5.0	0.0	43.1	18.3	57.9	140.2	155.7	127.0	65.8	34.3	18.3	6.6
MAX2	10.0	0.0	51.8	31.3	88.9	249.5	272.3	227.3	117.4	54.6	22.6	6.6
R.D.	3	0	7	6	17	20	27	27	26	17	8	2

ANNUAL TOTAL = 3442.0 MAX = 155.7 MAX2 = 155.7 R.D. = 160

3) Annual Hyetograph



Chapter 3

Streamflow Database

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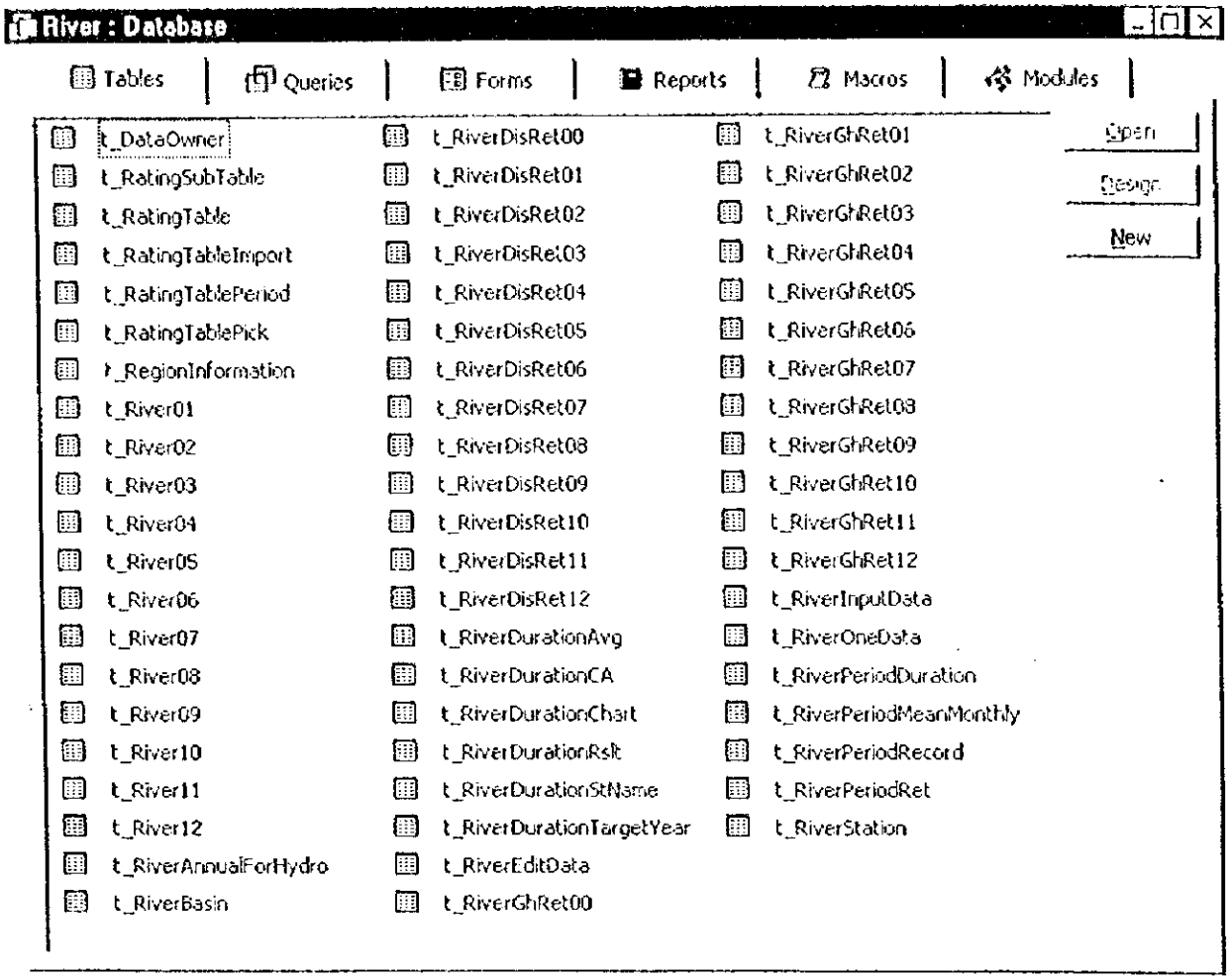
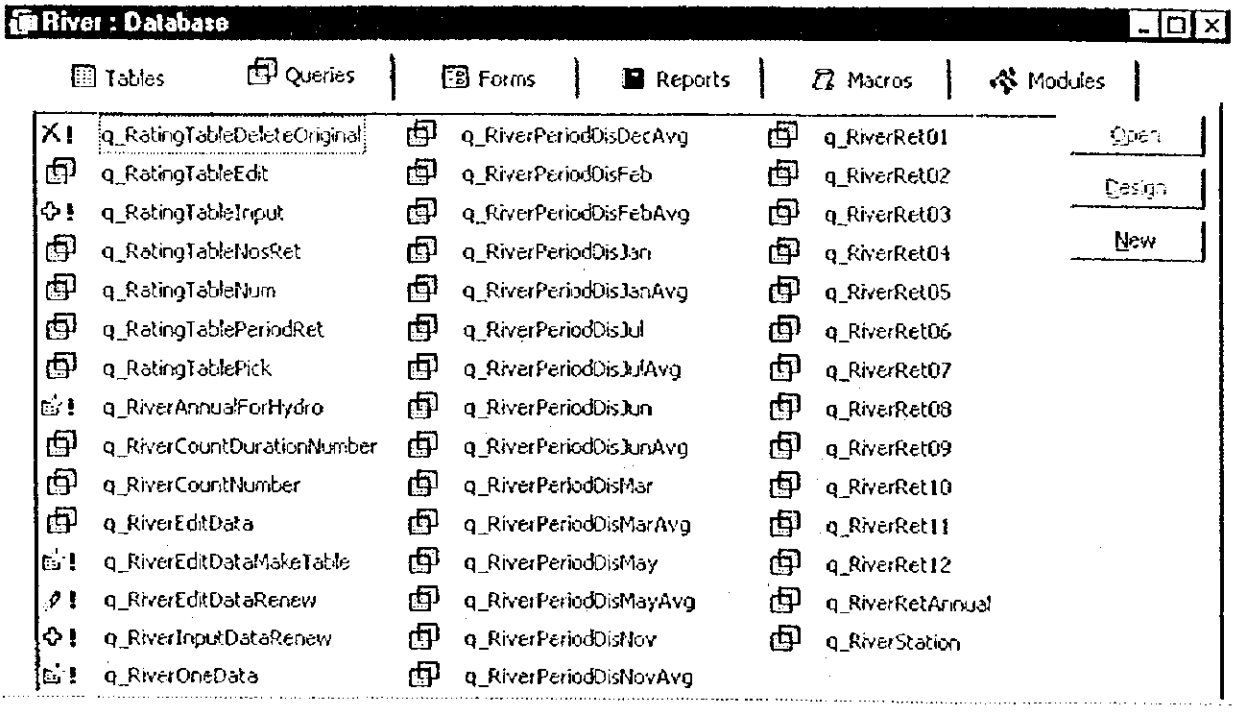
3.1 Database Components





q_RiverOneDataFromMap	q_RiverPeriodDisOct
q_RiverPeriodDisAnnualAvg	q_RiverPeriodDisOctAvg
q_RiverPeriodDisApr	q_RiverPeriodDisSep
q_RiverPeriodDisAprAvg	q_RiverPeriodDisSepAvg
q_RiverPeriodDisAug	q_RiverPeriodDuration
q_RiverPeriodDisAugAvg	q_RiverPeriodMakeTable
q_RiverPeriodDisDec	q_RiverPeriodRet

River : Database

Tables | Queries | Forms | Reports | Macros | Modules

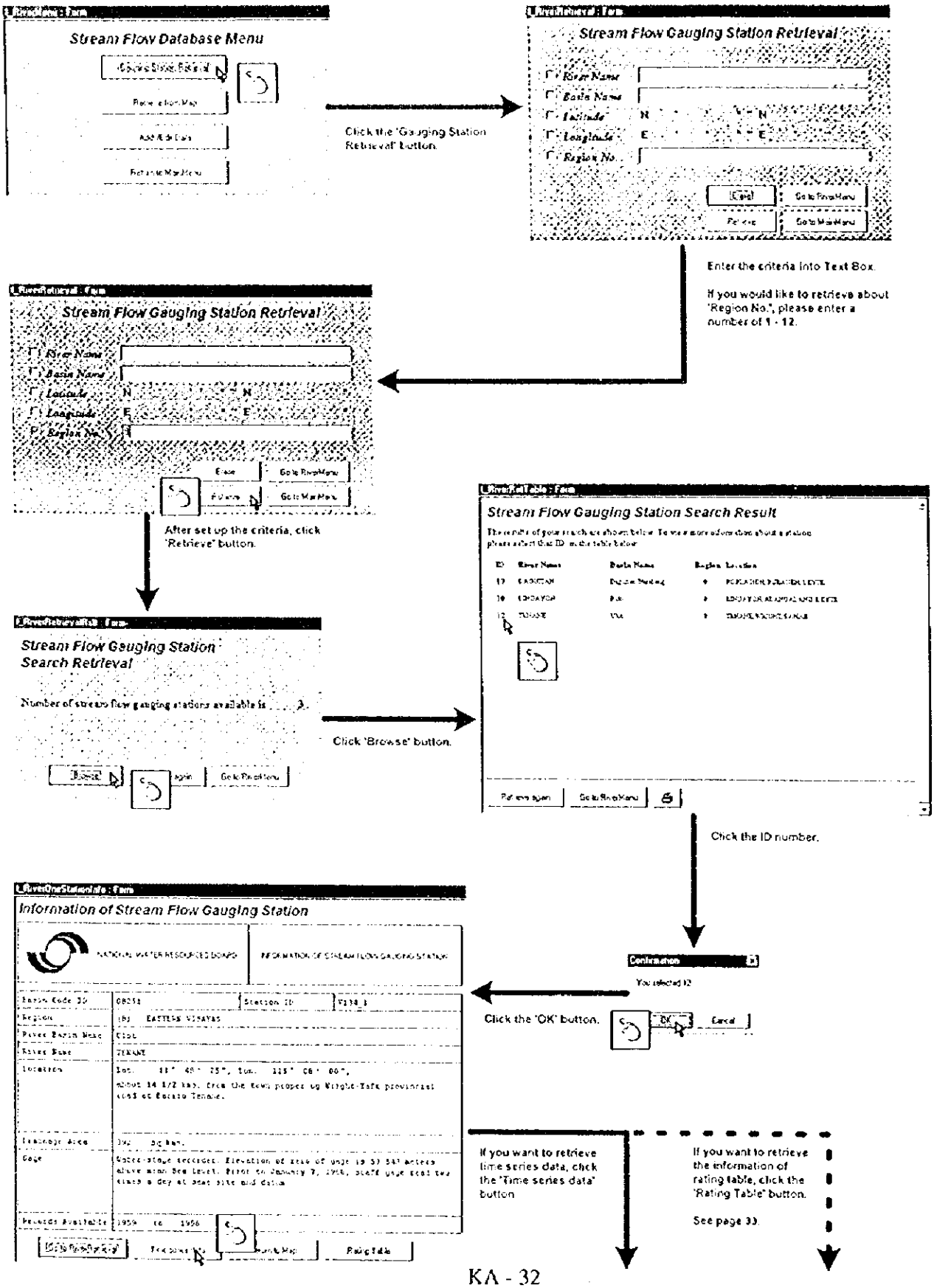
Open
Design
New

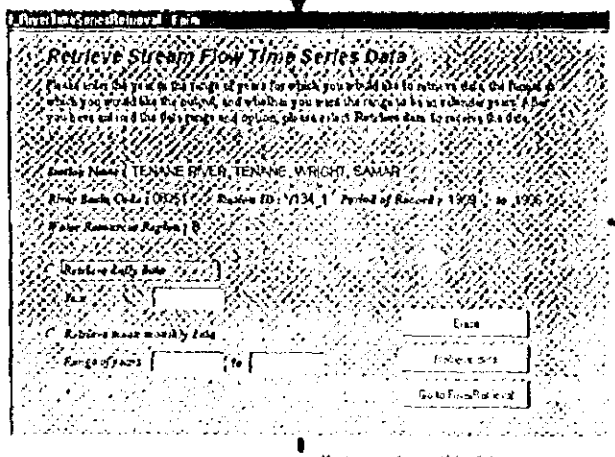
f_MapPhil	f_RiverExportFile	f_RiverPeriodRetRsltSub1
f_MapRegion1	f_RiverGhRetRslt	f_RiverPeriodRetRsltSub2
f_MapRegion10	f_RiverGhRetRsltSub00	f_RiverPeriodRetRsltSub3
f_MapRegion11	f_RiverGhRetRsltSub01	f_RiverPeriodRetRsltSub4
f_MapRegion12	f_RiverGhRetRsltSub02	f_RiverPeriodRetRsltSub5
f_MapRegion2	f_RiverGhRetRsltSub03	f_RiverPeriodRetRsltSub6
f_MapRegion3	f_RiverGhRetRsltSub04	f_RiverRetrieval
f_MapRegion4a	f_RiverGhRetRsltSub05	f_RiverRetrievalRslt
f_MapRegion4b	f_RiverGhRetRsltSub06	f_RiverRetRslt
f_MapRegion5	f_RiverGhRetRsltSub07	f_RiverRetRsltSub00
f_MapRegion6	f_RiverGhRetRsltSub08	f_RiverRetRsltSub01
f_MapRegion7	f_RiverGhRetRsltSub09	f_RiverRetRsltSub02
f_MapRegion8	f_RiverGhRetRsltSub10	f_RiverRetRsltSub03
f_MapRegion9	f_RiverGhRetRsltSub11	f_RiverRetRsltSub04
f_MapSelectStation	f_RiverGhRetRsltSub12	f_RiverRetRsltSub05
f_MapStationSample	f_RiverGhRetRsltSub13	f_RiverRetRsltSub06
f_RatingCurveApplyPeriod	f_RiverHydroGraph	f_RiverRetRsltSub07
f_RatingCurveGraph	f_RiverInput	f_RiverRetRsltSub08
f_RatingTableEdit	f_RiverInputDisData	f_RiverRetRsltSub09
f_RatingTableEditorMenu	f_RiverInputGhData	f_RiverRetRsltSub10
f_RatingTableInfo	f_RiverInputMenu	f_RiverRetRsltSub11
f_RatingTableInput	f_RiverMenu	f_RiverRetRsltSub12
f_RatingTablePick	f_RiverOneStationInfo	f_RiverRetRsltSub13
f_RiverEditDisData	f_RiverPeriodMonthRslt	f_RiverRetTable
f_RiverEditGhData	f_RiverPeriodRetRslt	f_RiverTimeSeriesRetrieval

3.2 Streamflow Gauging Station Data (Discharge / Gauge Height / Rating Table)

3.2.1 How to Retrieve

1) Using Retrieval Menu

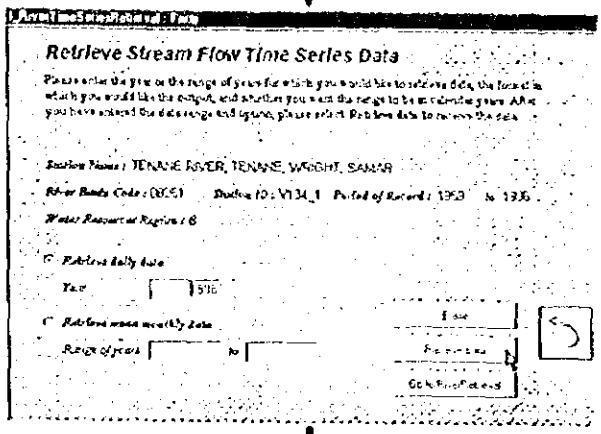




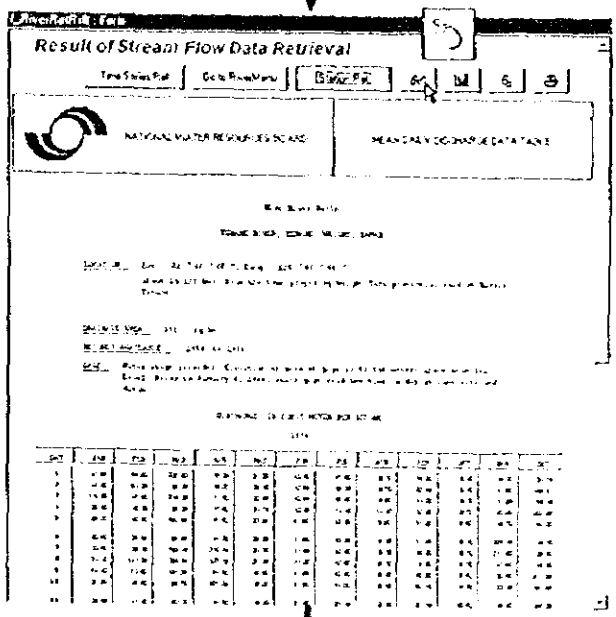
If you need daily data, enter the year into the Text Box of 'Year'.

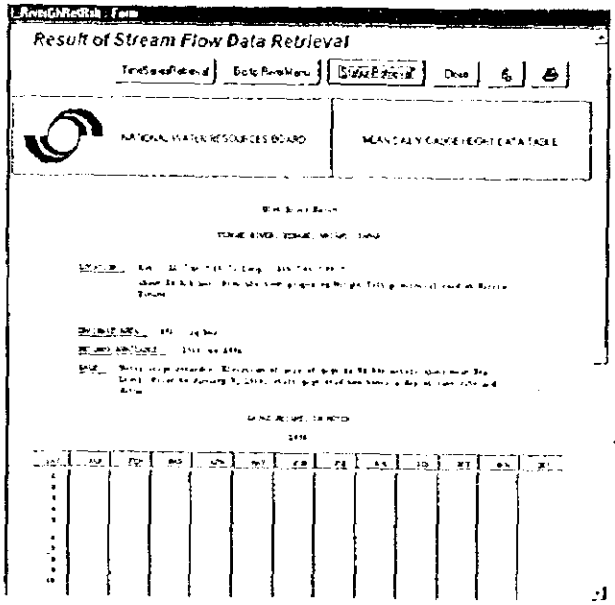
If you want monthly data, enter the period into the Text Box of 'Range of years'.

See Page 32



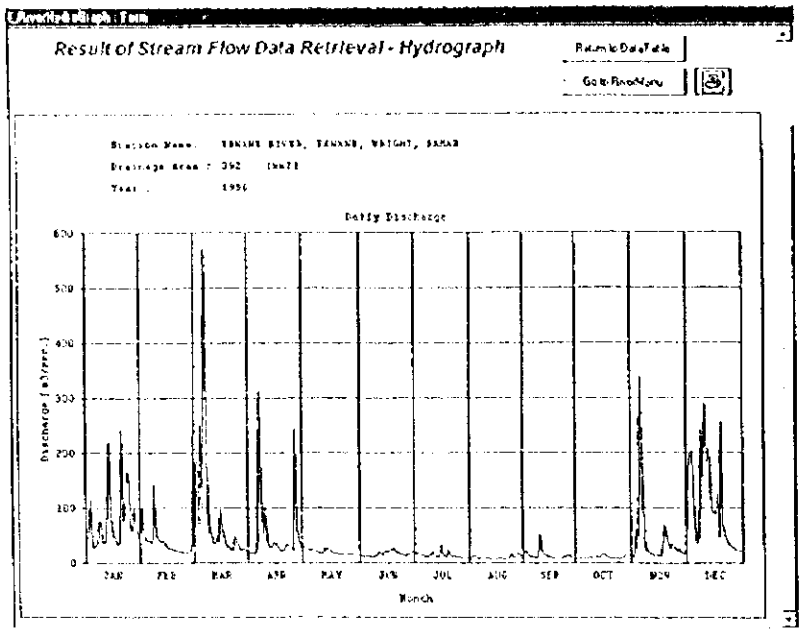
Click 'Retrieve data' button.



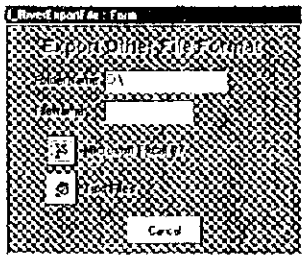


If you want to see also the gauge height data, click the 'SeeAlso' button.

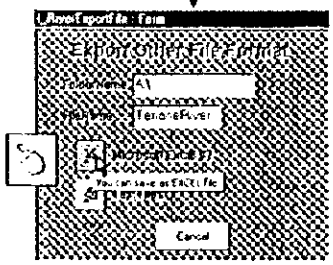
On the discharge form of search results, you can get annual hydrograph when you click this (DrawGraph) button.



On the forms of search results, you can export to other file format when you click this (ExportData) button.

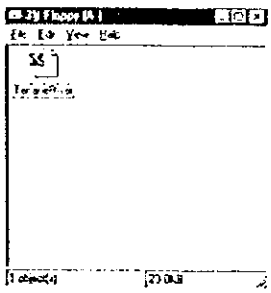


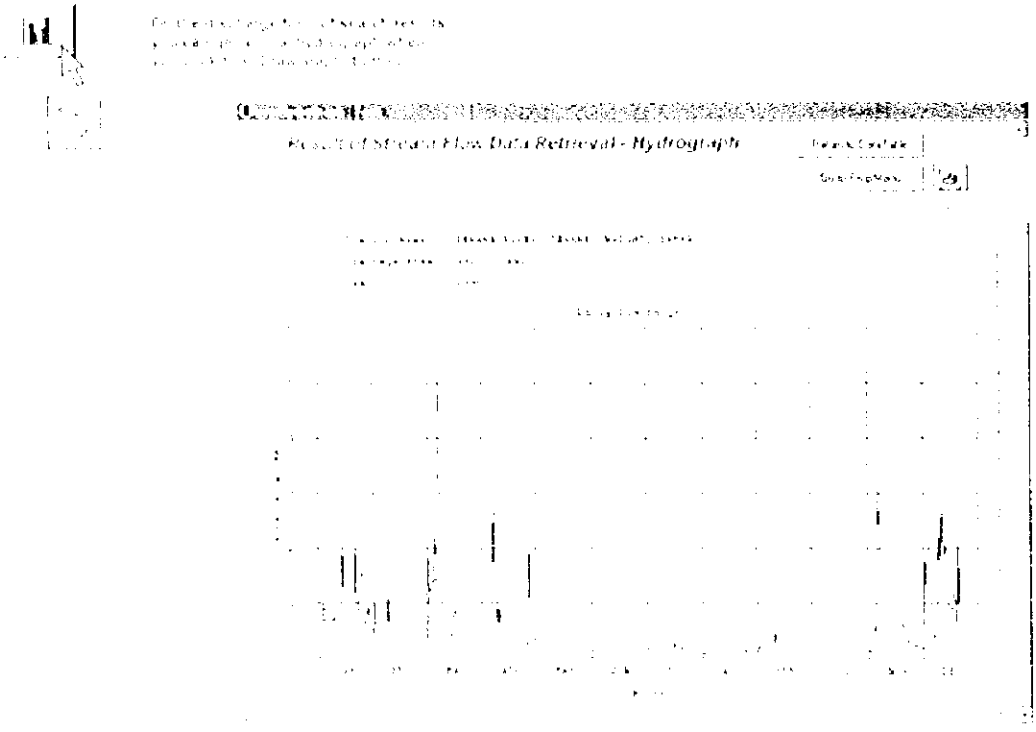
Enter the file name and folder (directory) which you want to place.

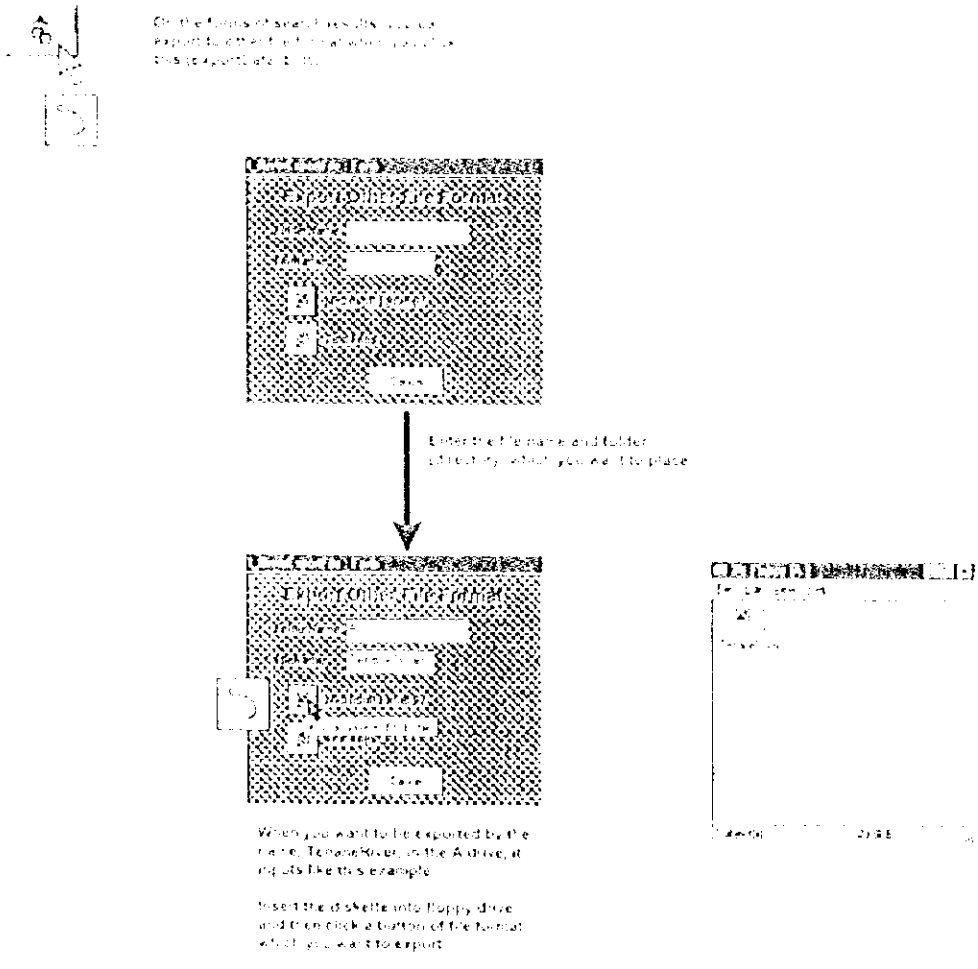


When you want to be exported by the name, TenaneRiver, in the A drive, it inputs like this example.

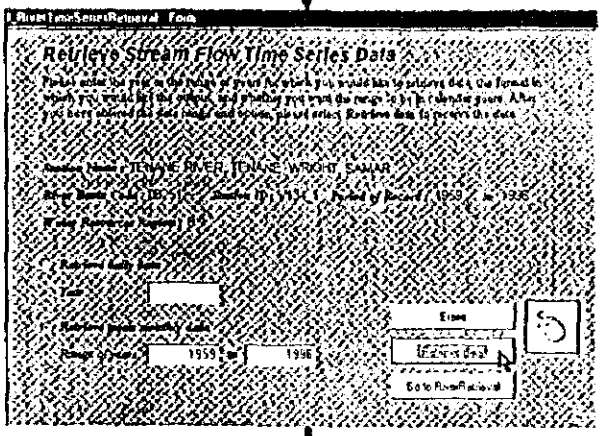
Insert the diskette into floppy drive, and then click a button of file format which you want to export.



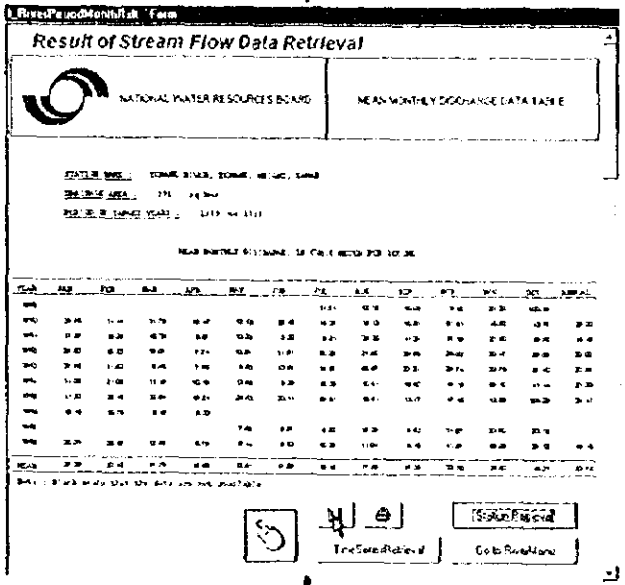




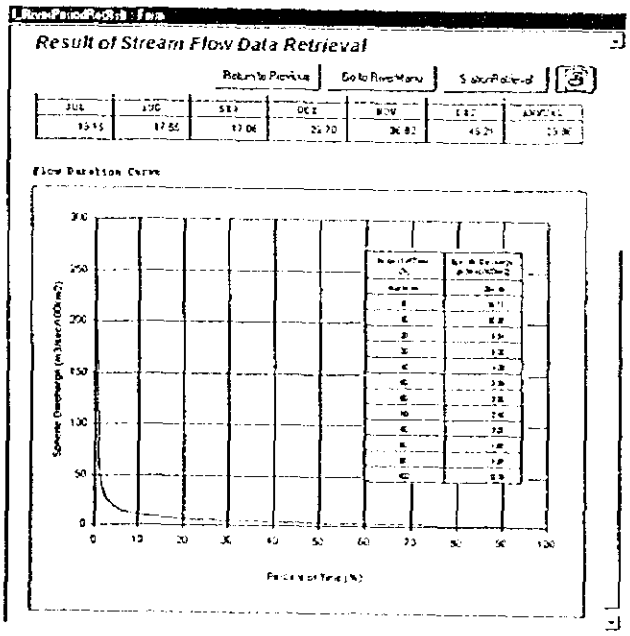
From Page 30.

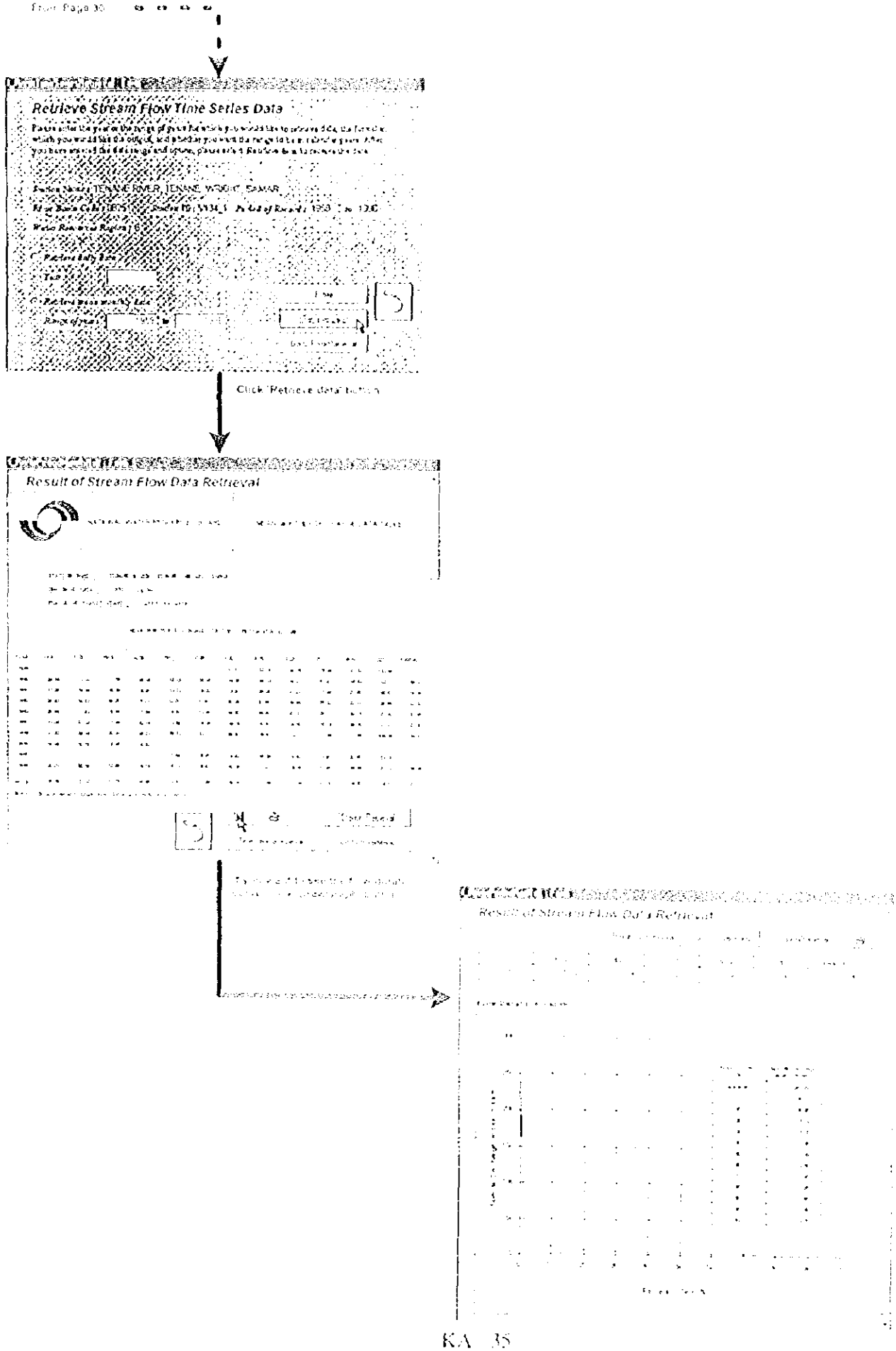


Click 'Retrieve data' button.

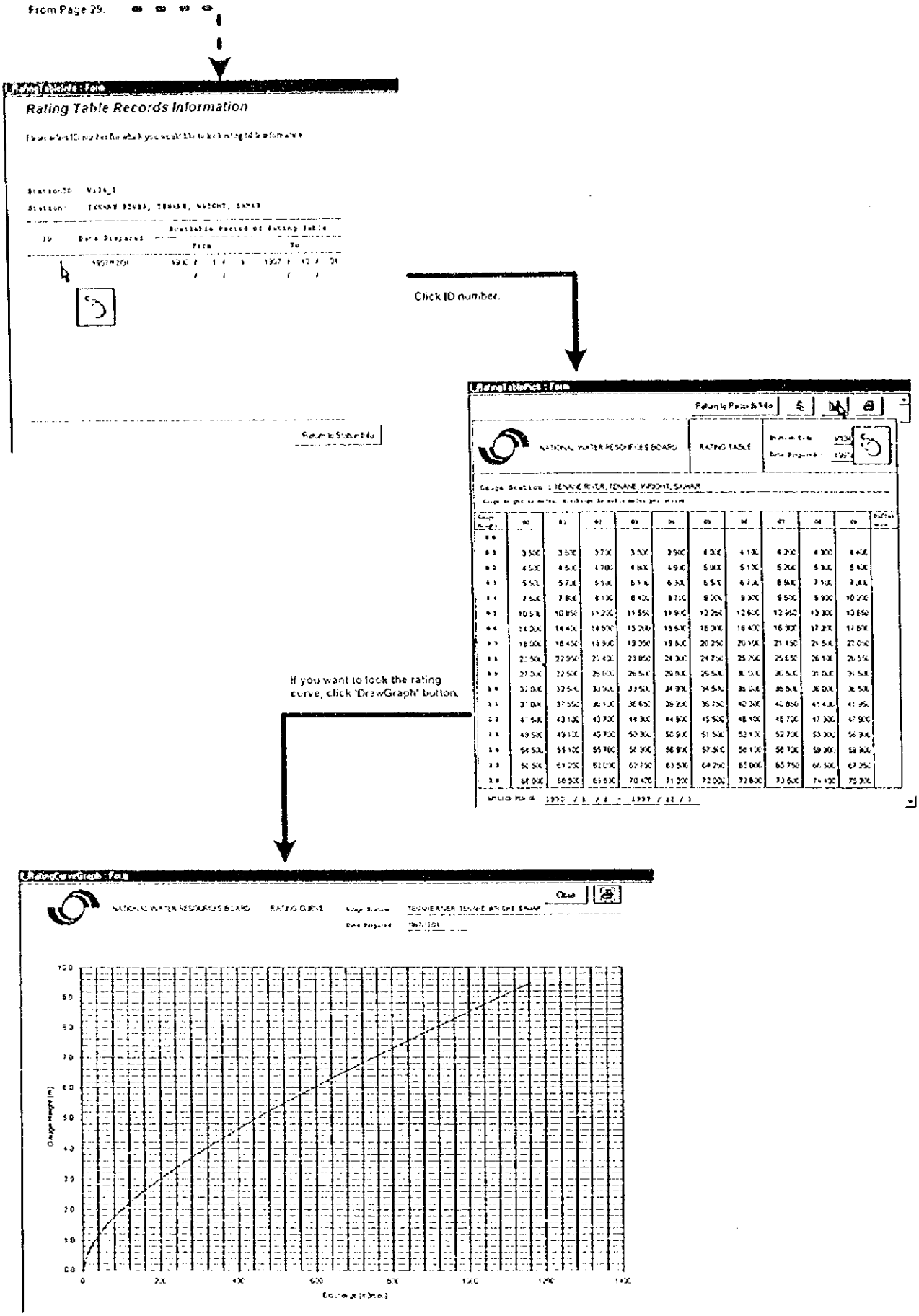


If you want to see the flow duration curve, click 'DrawGraph' button.

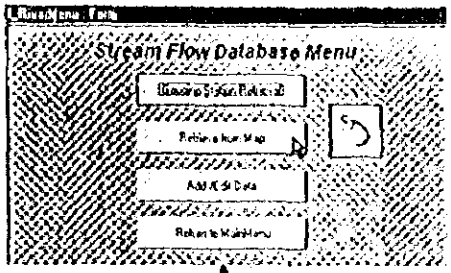



Retrieve Stream Flow Time Series Data
Result of Stream Flow Data Retrieval
Result of Stream Flow Data Retrieval

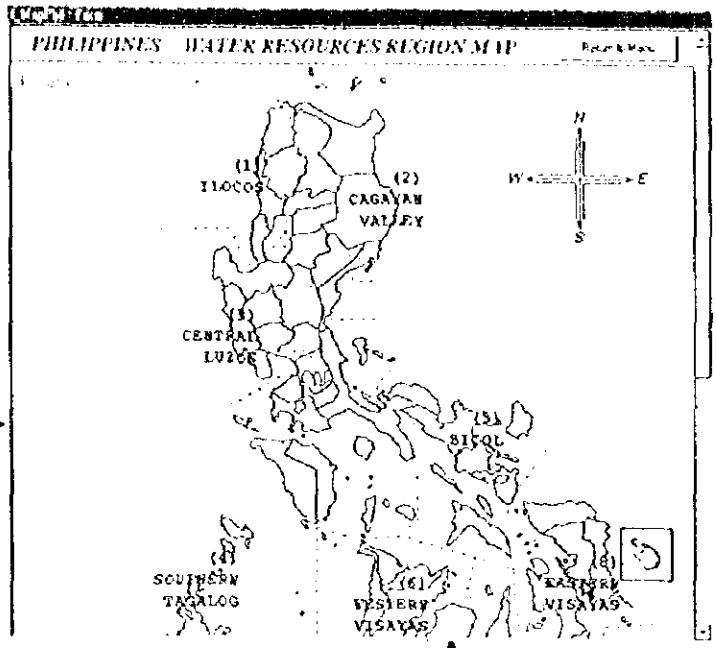
From Page 29.


Rating Table Records Information
Click ID number.
NATIONAL WATER RESOURCES BOARD
RATING TABLE
If you want to look the rating curve, click 'DrawGraph' button.
NATIONAL WATER RESOURCES BOARD
RATING CURVE
Close

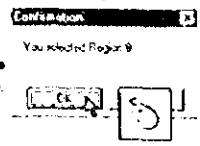
2) Using Retrieval Map



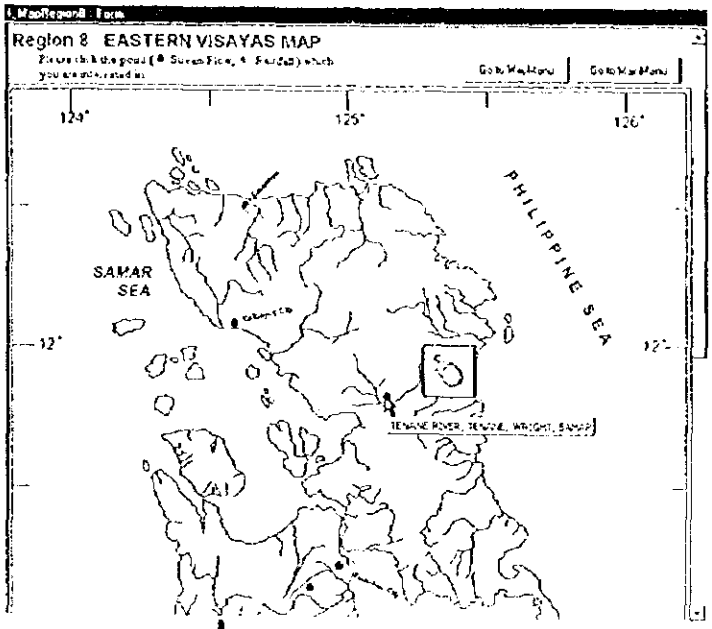
Click the 'Retrieve from Map' button.



Click a region name (blue character).

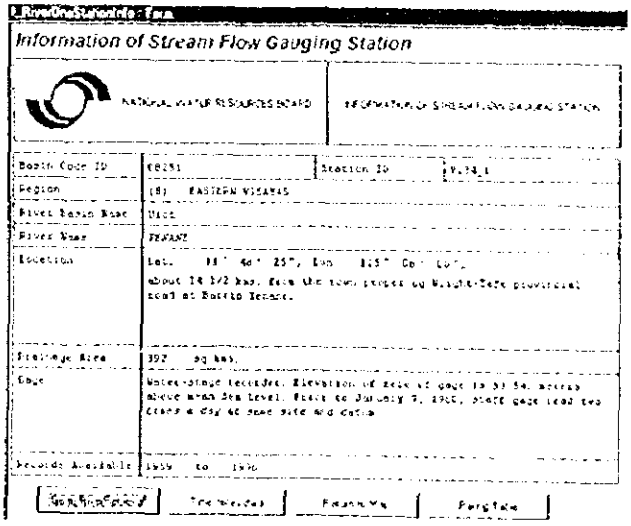


Click 'OK' button.



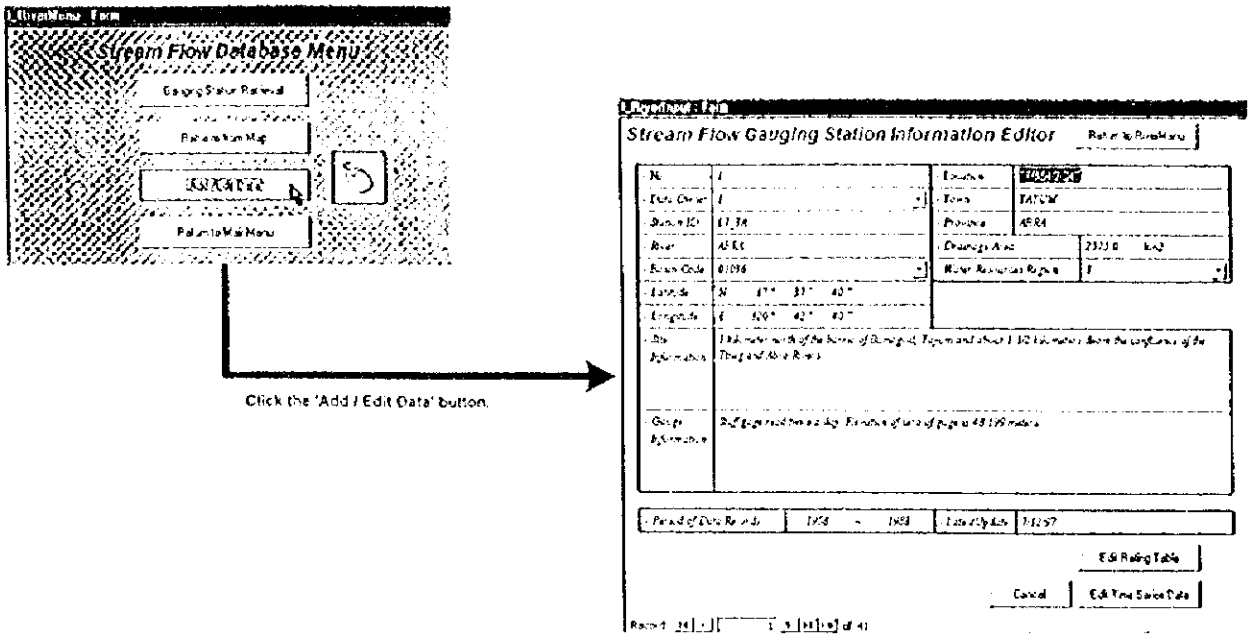
Click a stream flow gauging station button (red color).

Rainfall station button (light blue color) is not available when you are searching a station for stream flow data.

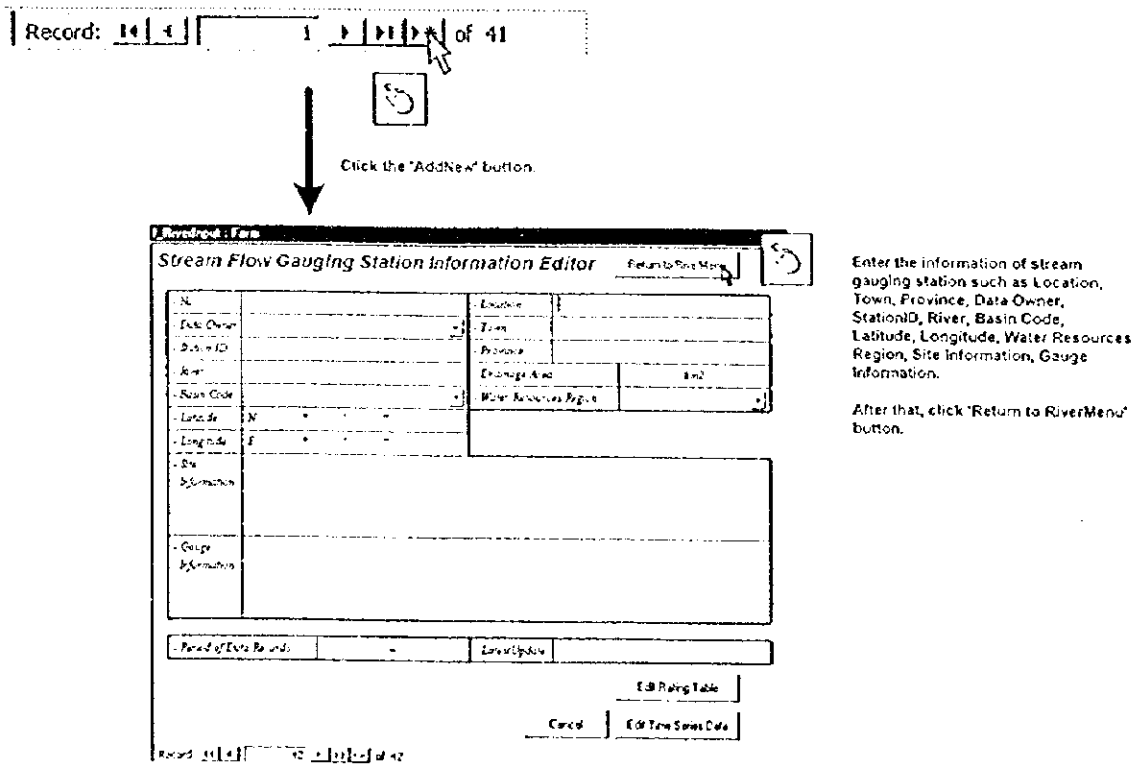


After this, you are possible to advance in the way of '1) Using Retrieval Menu'

3.2.2 How to Add / Edit



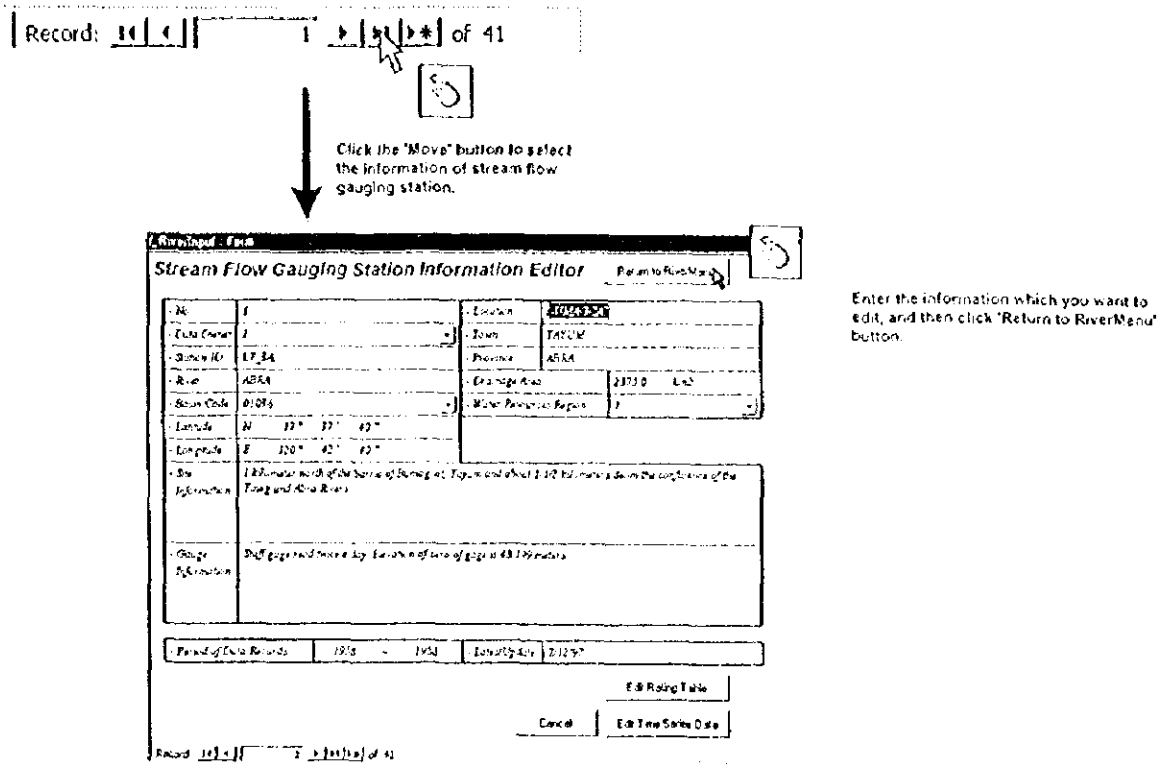
1) Add New Information of Streamflow Gauging Station



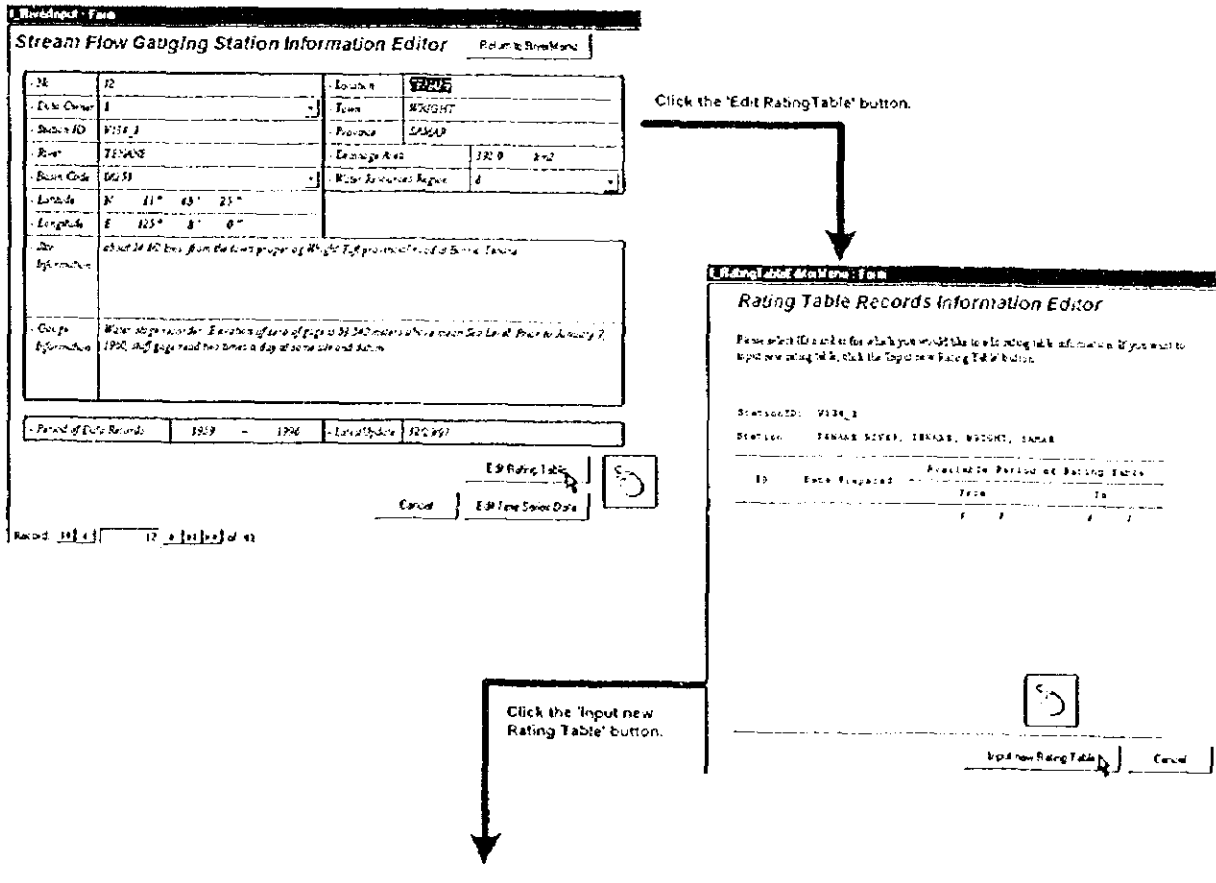
Enter the information of stream gauging station such as Location, Town, Province, Data Owner, StationID, River, Basin Code, Latitude, Longitude, Water Resources Region, Site Information, Gauge Information.

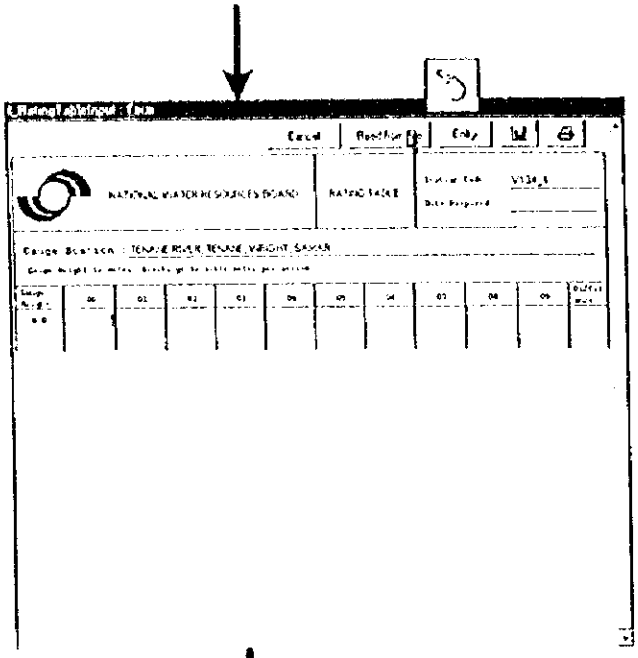
After that, click 'Return to RiverMenu' button.

2) Edit the Information of Streamflow Gauging Station

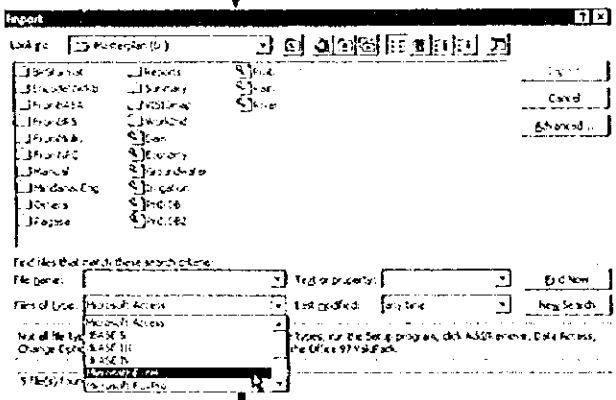


3) Add New data of Rating Table

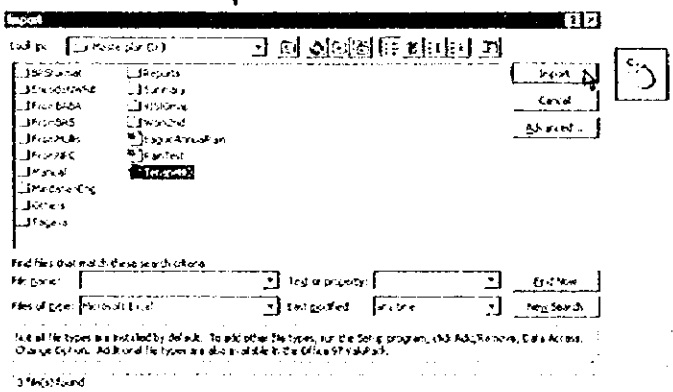




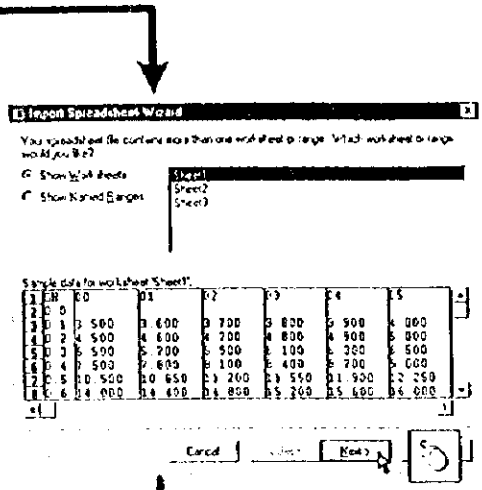
Click the 'Read from File' button if you want to read from other file format such as Microsoft Excel.



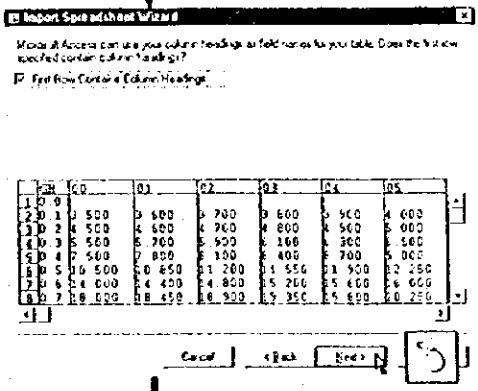
From Combo Box of 'Files of type', select the files of type which you want to open. In this case, select Microsoft Excel.



Select the file which you want to open, and then click 'Import' button.

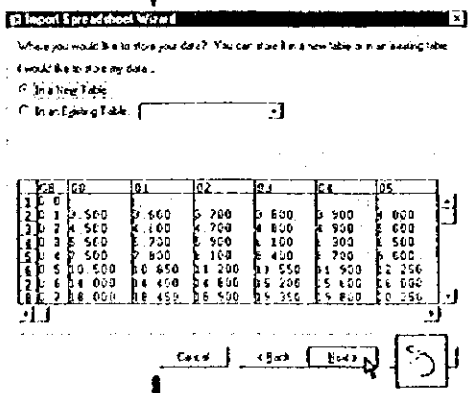


Select the Option Button of 'Show Worksheets', and then click 'Next >' button.

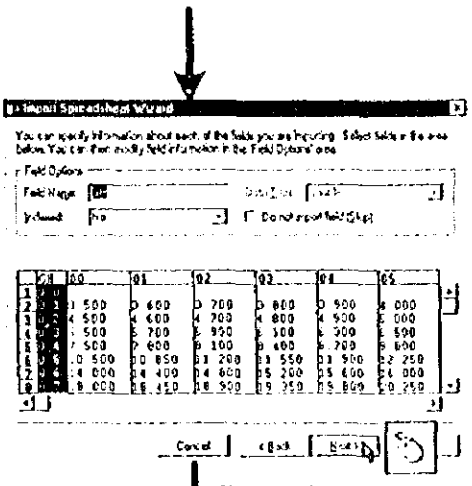


If there are column heading in the first row of sheet, you must click the Check Box of 'First Row Contains Column Headings'.

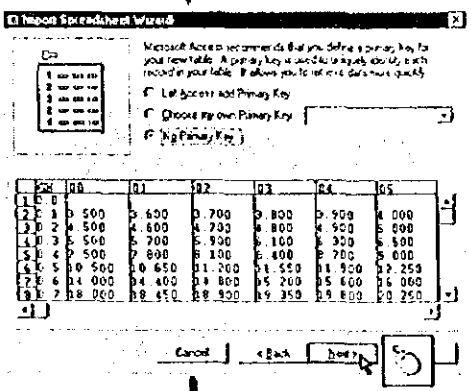
And then click 'Next >' button.



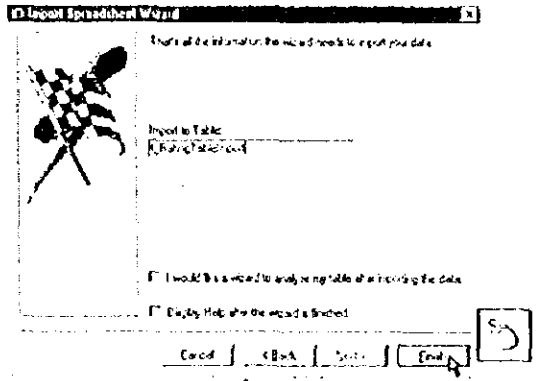
Select the Option Button of 'In a New Table', and then click 'Next >' button.



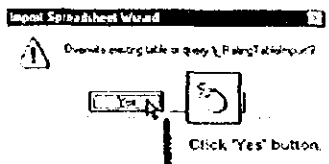
Click 'Next >' button.



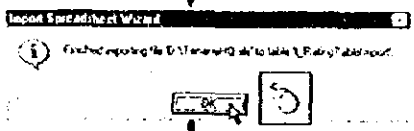
Click Option Button of 'No Primary Key', and then click 'Next >' button.



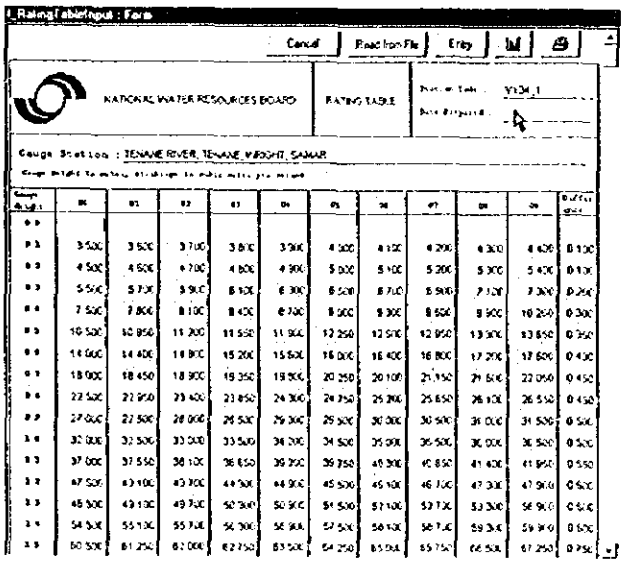
Enter as 'I_RatingTableImport' into the Text Box of 'Import to Table', and then click 'Finish' button.



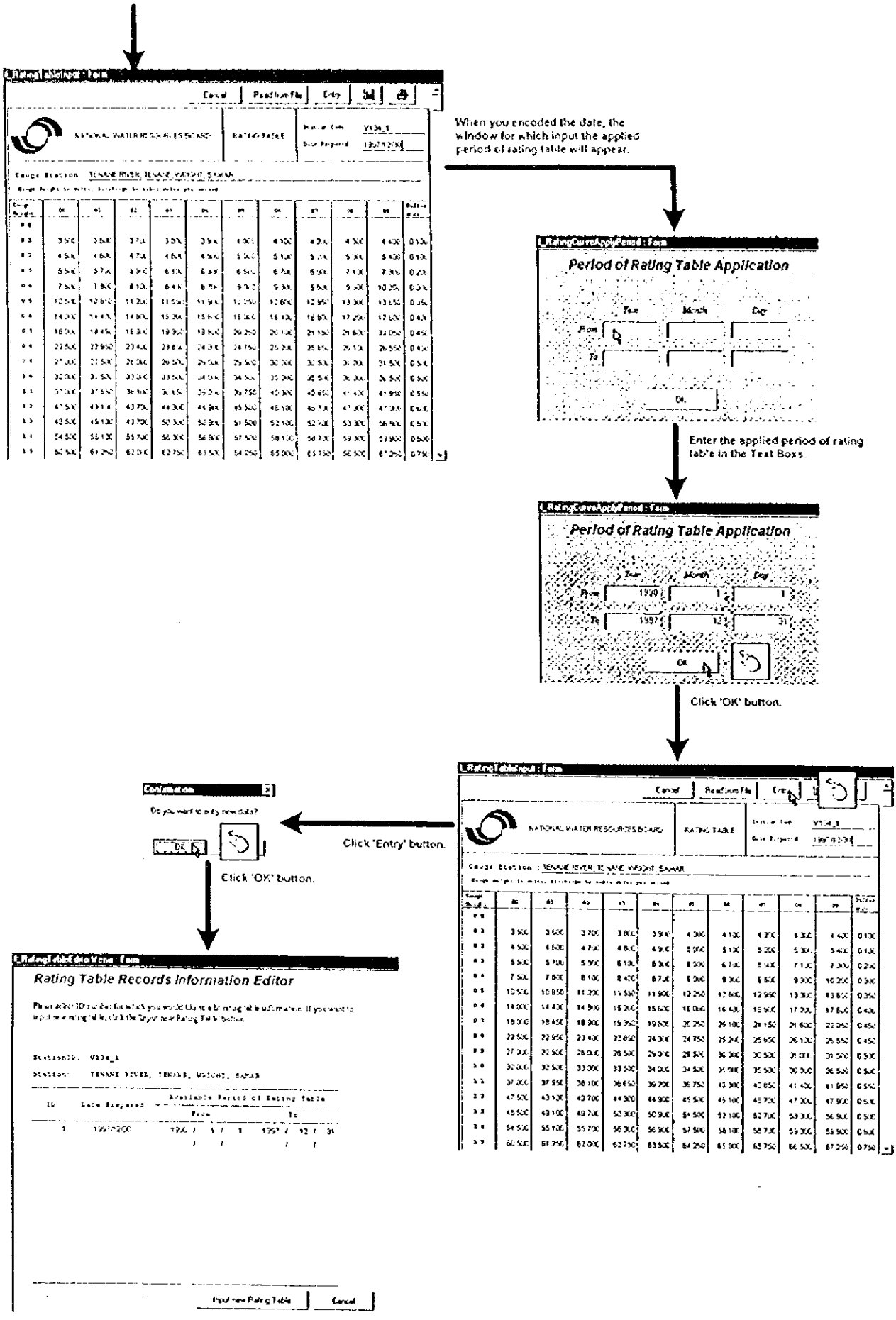
Click 'Yes' button.



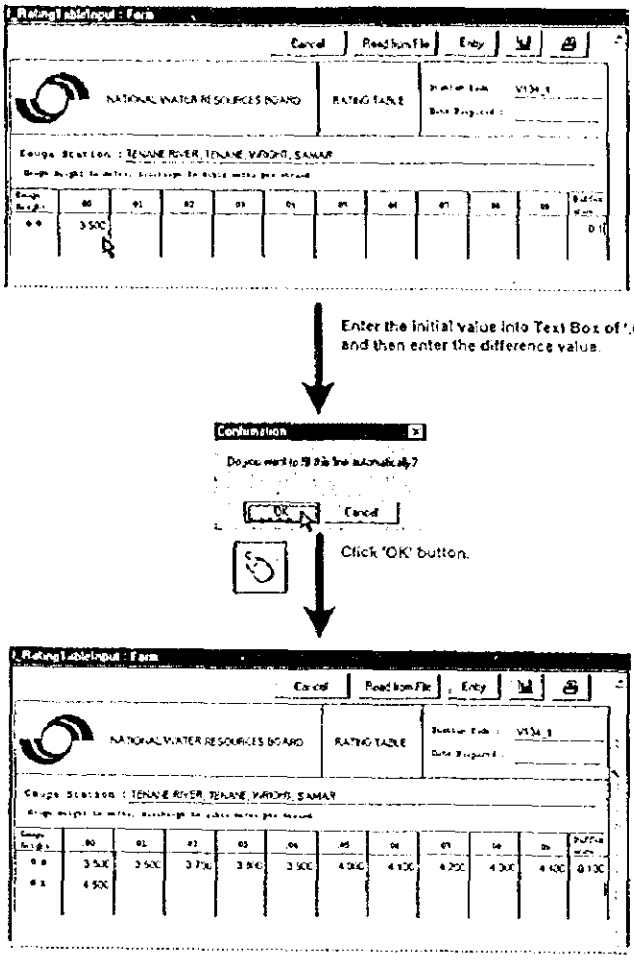
Click 'OK' button.



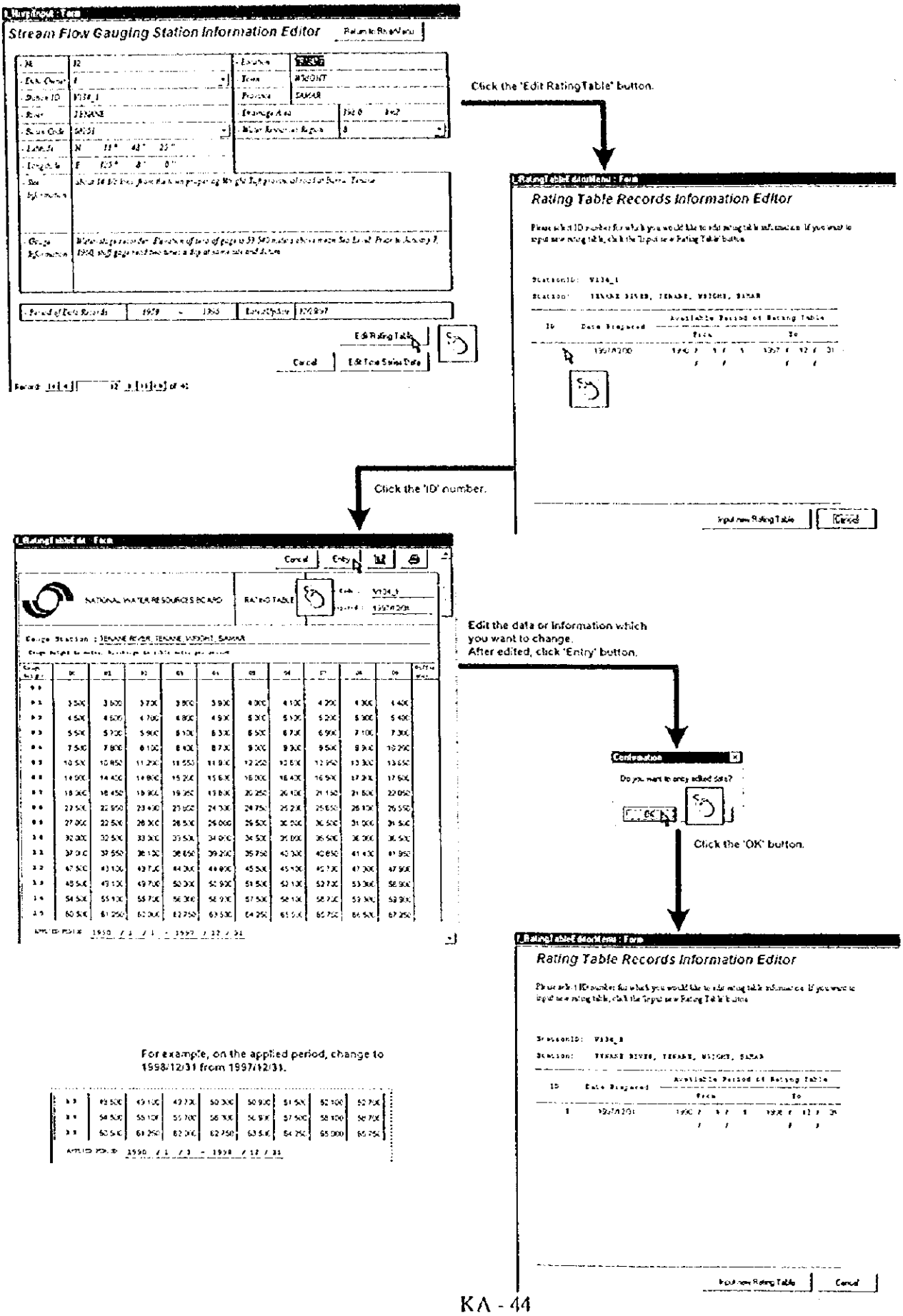
After read or encoded data, enter the date as following format into Text Box of 'Date Prepared'.
[e.g.] 1997/12/30


When you encoded the date, the window for which input the applied period of rating table will appear.
Period of Rating Table Application
Year
Month
Day
From
To
OK
Enter the applied period of rating table in the Text Boxs.
Period of Rating Table Application
1990
1997
OK
Click 'OK' button.
Confirmation
Do you want to entry new data?
OK
Click 'Entry' button.
Click 'OK' button.
Rating Table Records Information Editor
Input new Rating Table
Cancel

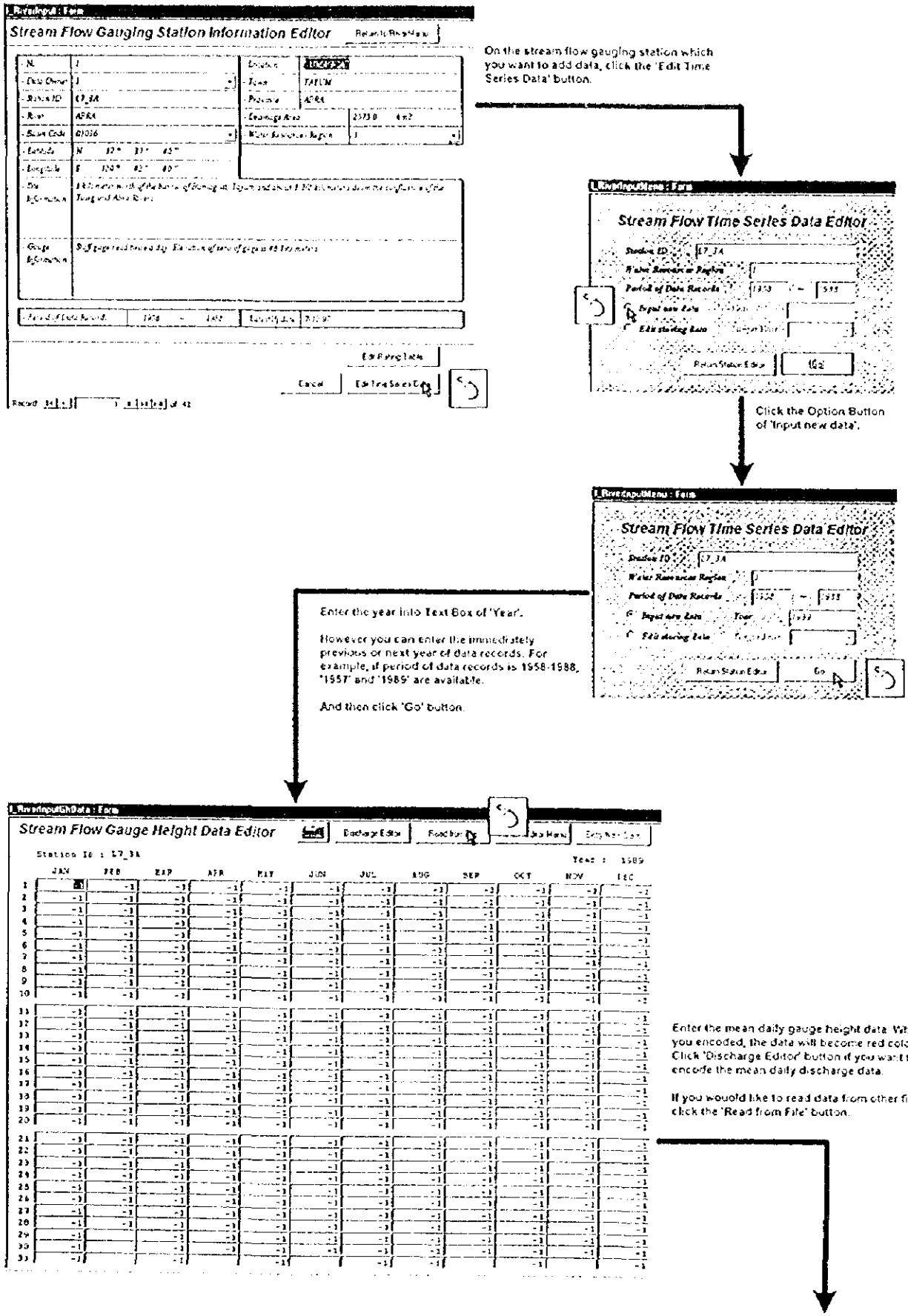
If you want to encode directly in the sheet, you can make quickly by using following technique.

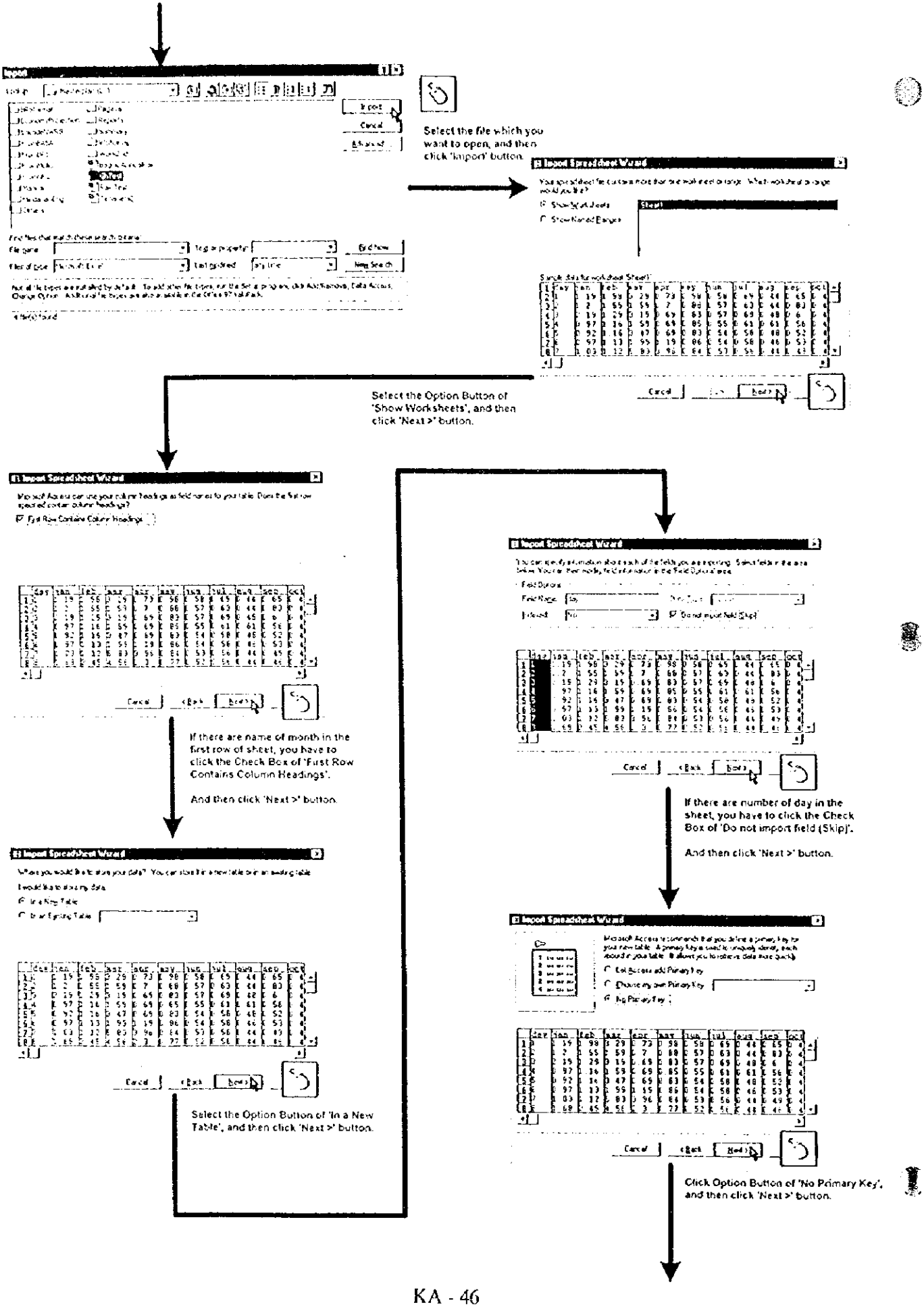


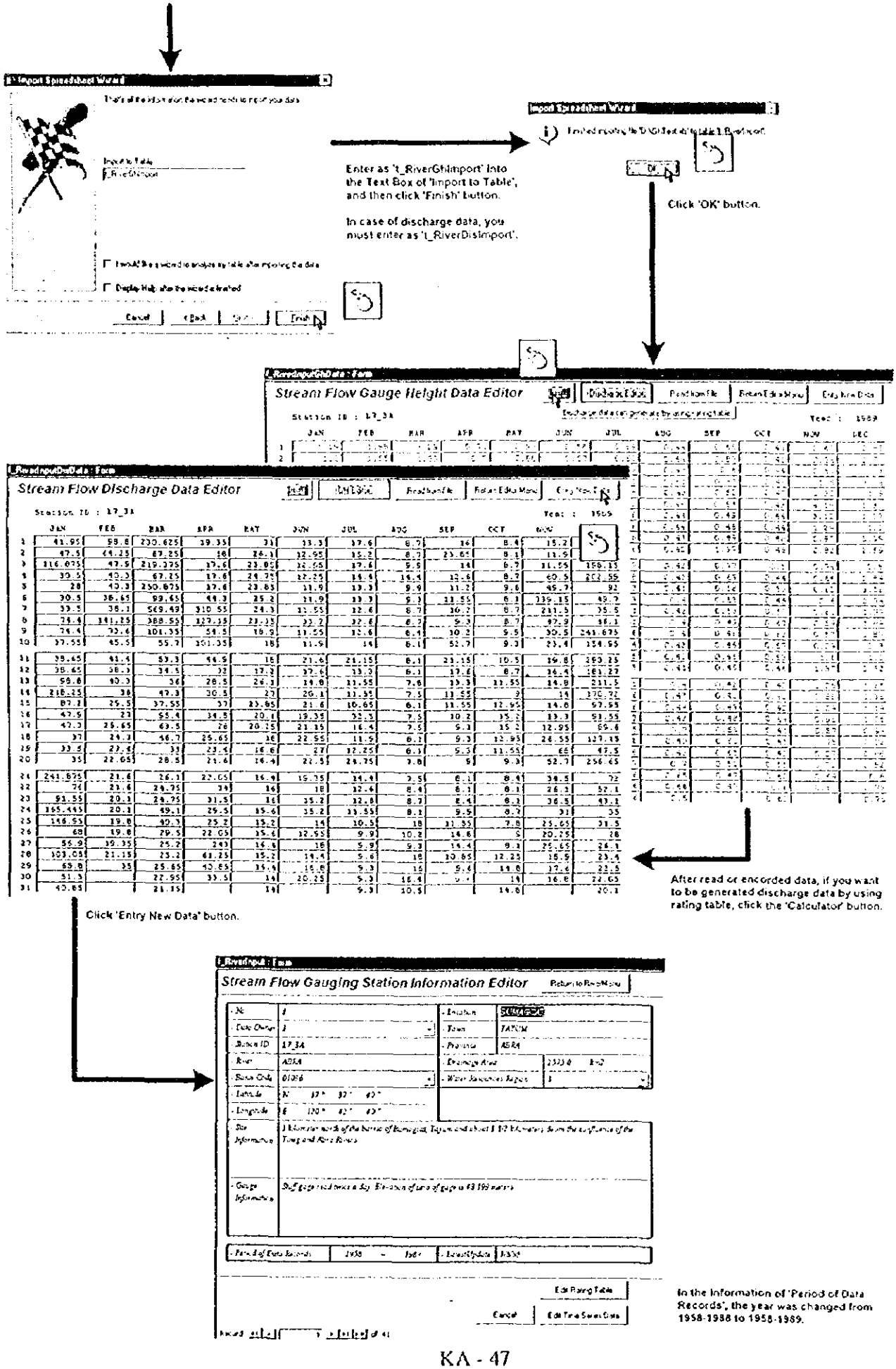
4) Edit the data of Rating Table



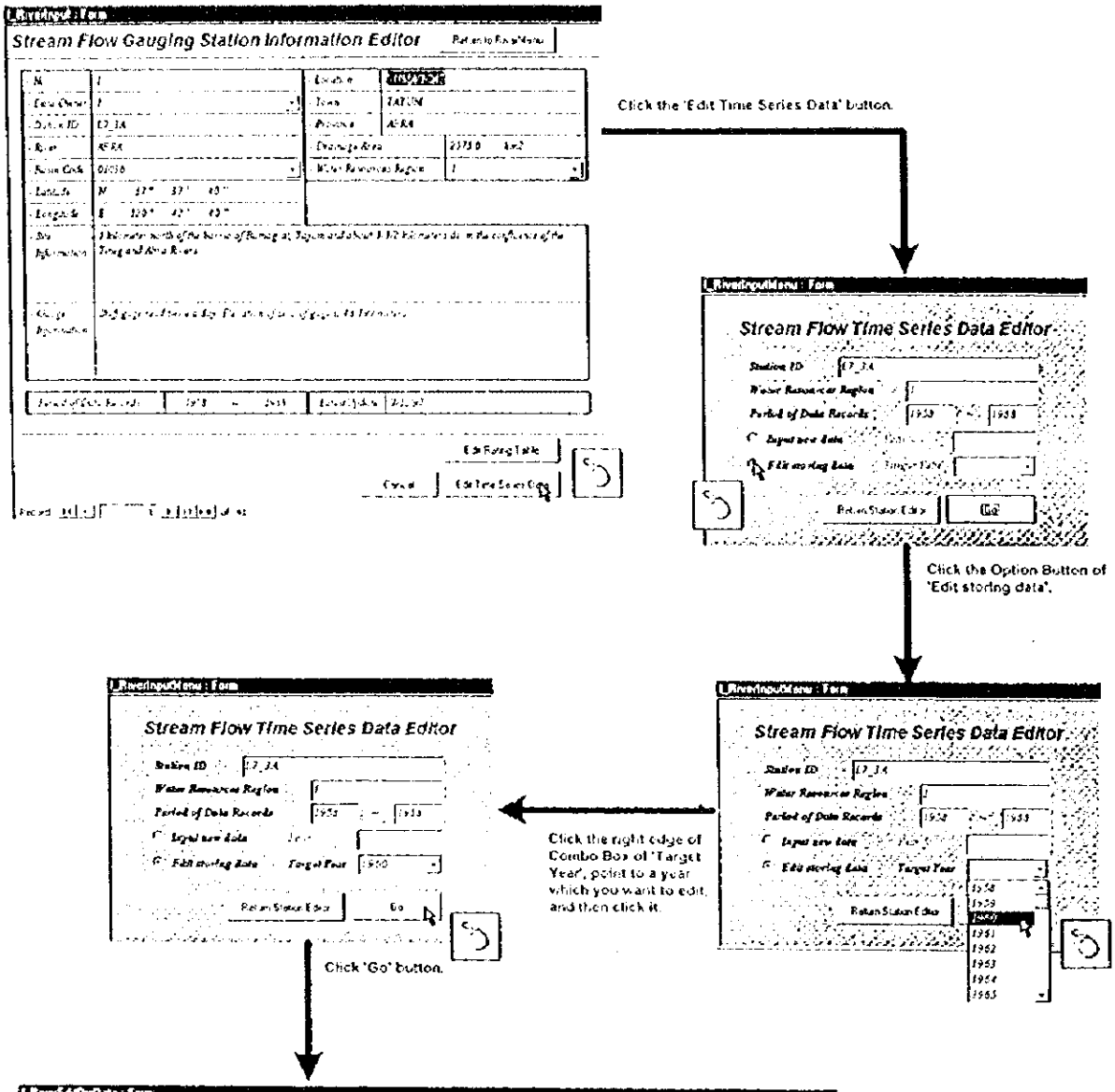
5) Add New Mean Daily Discharge / Gauge Height Data




Select the file which you want to open, and then click 'Import' button.
Select the Option Button of 'Show Worksheets', and then click 'Next >' button.
If there are name of month in the first row of sheet, you have to click the Check Box of 'First Row Contains Column Headings'.
And then click 'Next >' button.
If there are number of day in the sheet, you have to click the Check Box of 'Do not import field (Skip)'.
And then click 'Next >' button.
Select the Option Button of 'In a New Table', and then click 'Next >' button.
Click Option Button of 'No Primary Key', and then click 'Next >' button.


Enter as 't_RiverGHImport' into the Text Box of 'Import to Table', and then click 'Finish' button.
In case of discharge data, you must enter as 't_RiverDisImport'.
Click 'OK' button.
Stream Flow Gauge Height Data Editor
Stream Flow Discharge Data Editor
Click 'Entry New Data' button.
After read or encorded data, if you want to be generated discharge data by using rating table, click the 'Calculator' button.
Stream Flow Gauging Station Information Editor
In the Information of 'Period of Data Records', the year was changed from 1958-1988 to 1958-1989.

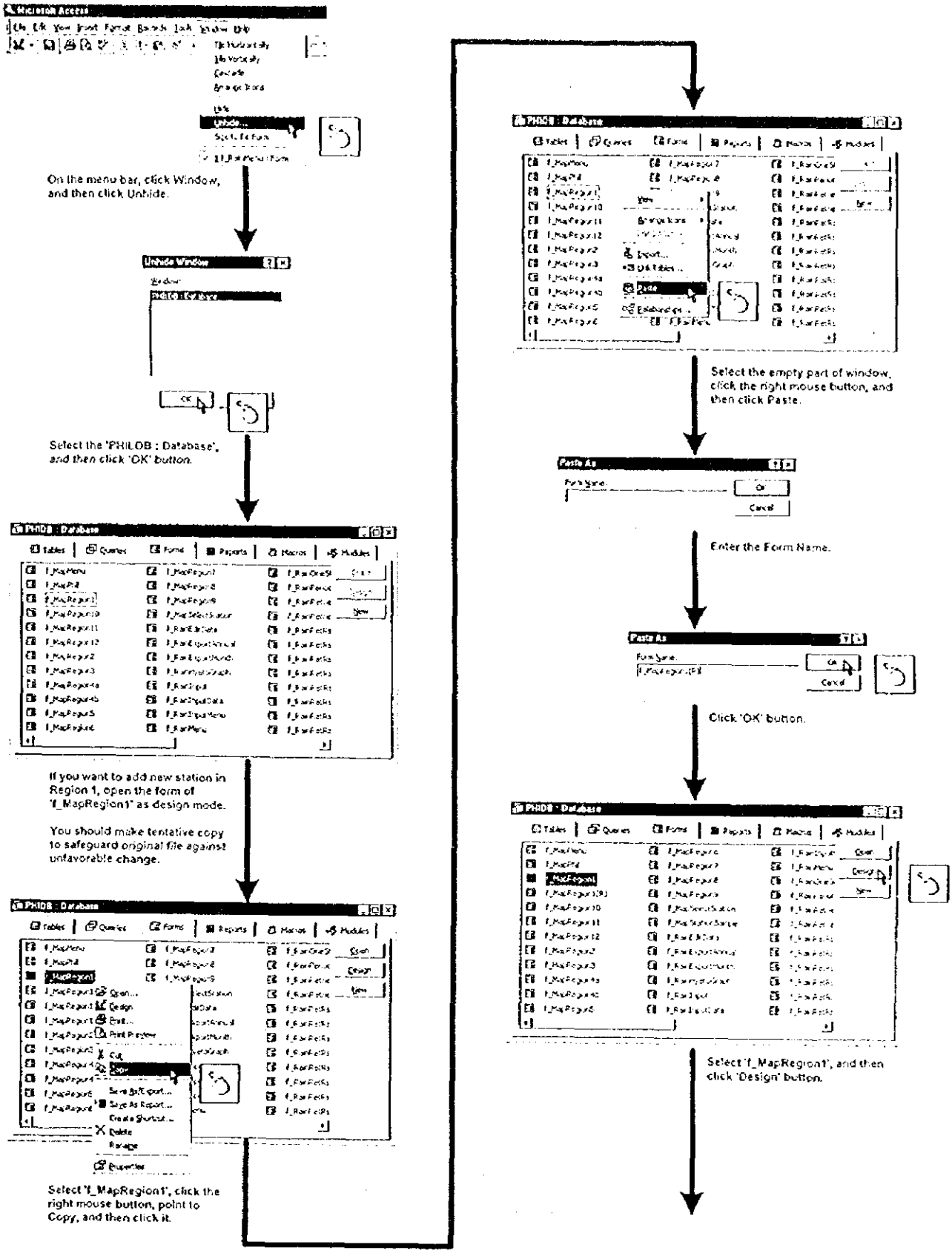
6) Edit Mean Daily Discharge / Gauge Height Data

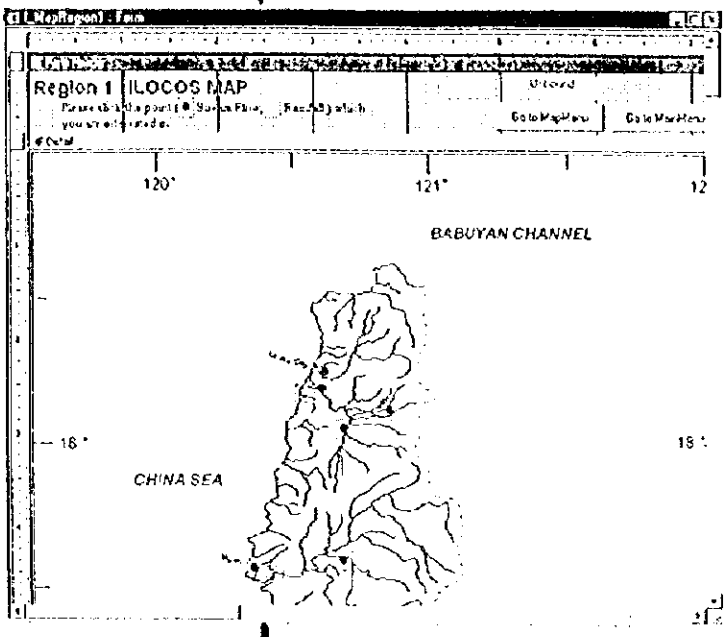


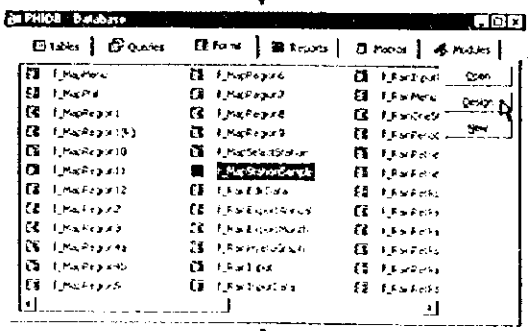
Edit mean daily discharge / Gauge Height data. Edited data will change to the red character.

After edited, click the 'Entry Edited Data' button.

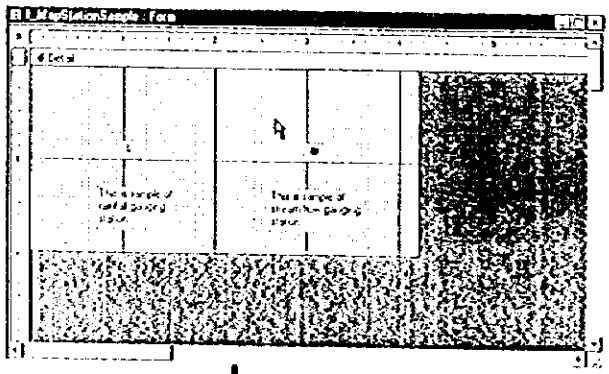
7) Add New Information of Streamflow Gauging Station on Regional Map



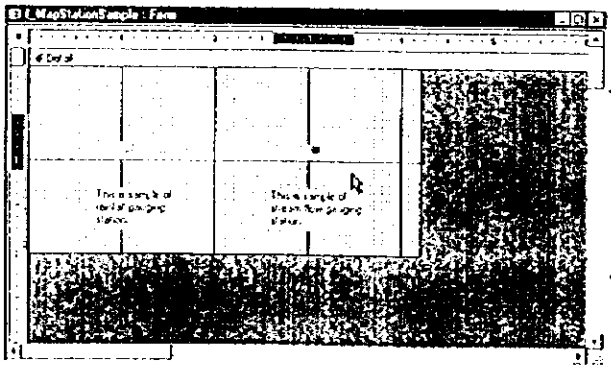




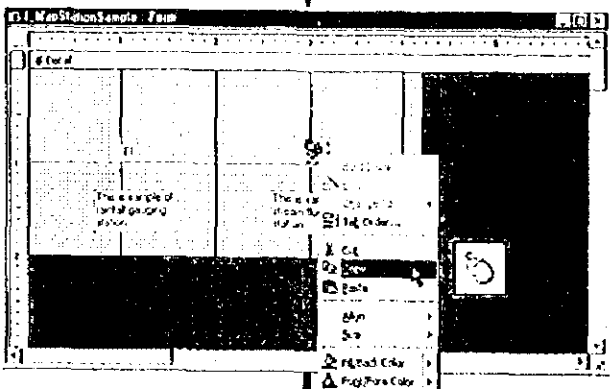
On the Database Window, select 'f_MapStationSample', and then click 'Design' button.



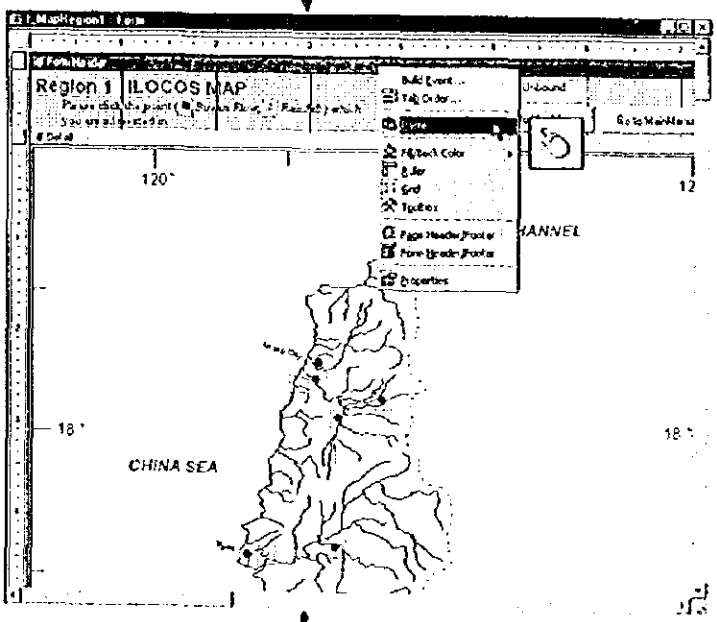
To select objects for stream flow gauging station, press and hold down the left mouse button, and point to where you want the objects.



And then release the mouse button.

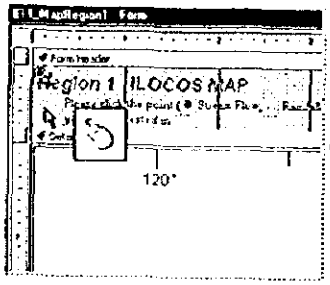


Click the right mouse button on selected objects, and then click Copy.

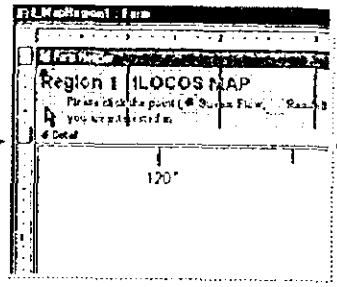


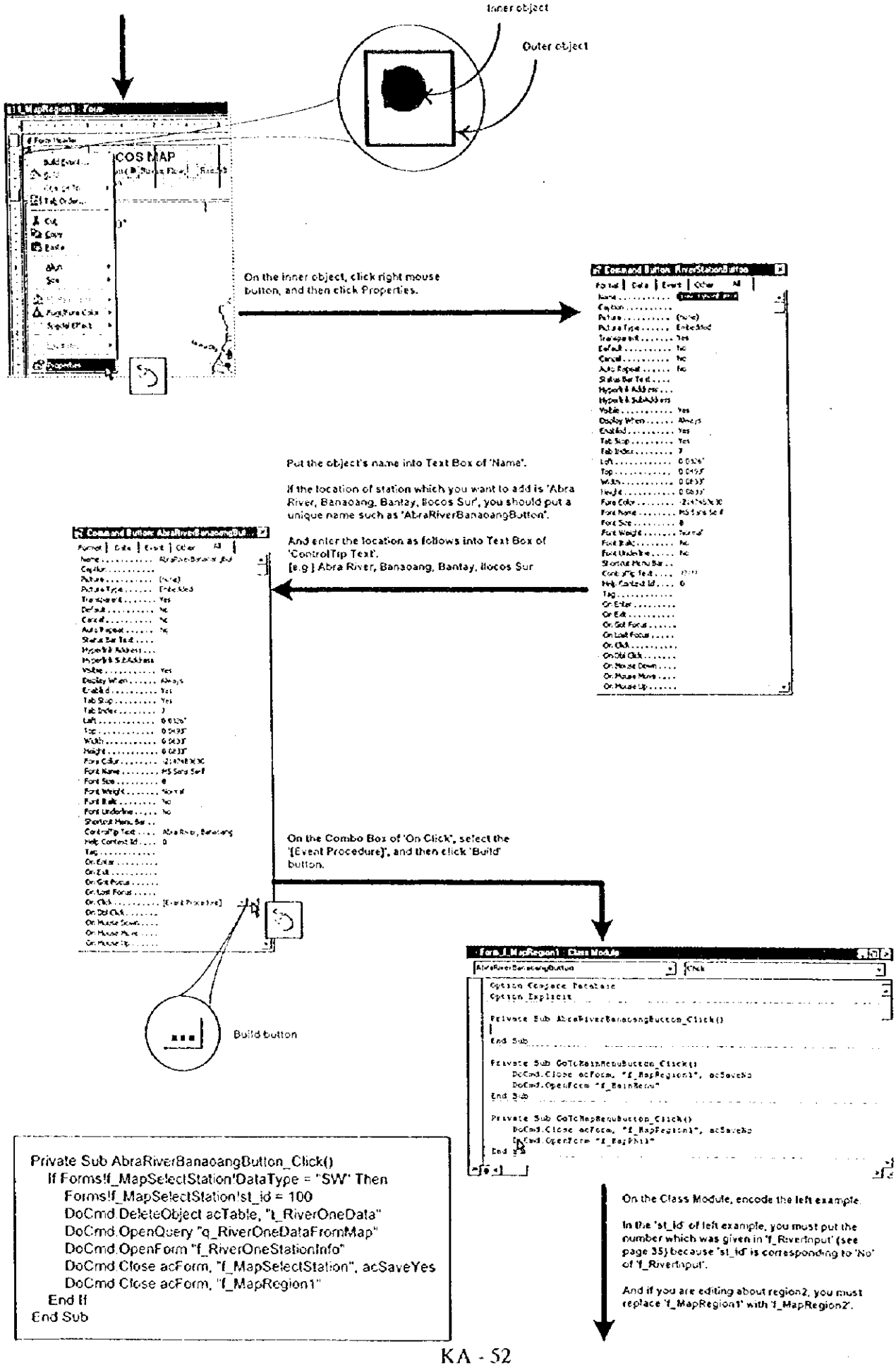
On the window of 'f_MapRegion1', select the Form Header, and click the right mouse button, and then click Paste.

The objects will appear in the upper left corner.

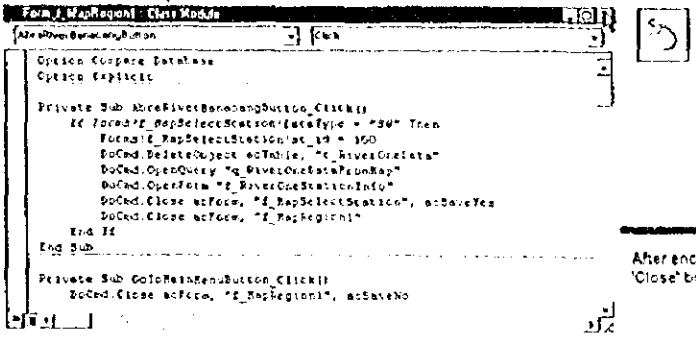


Click the empty part of window.

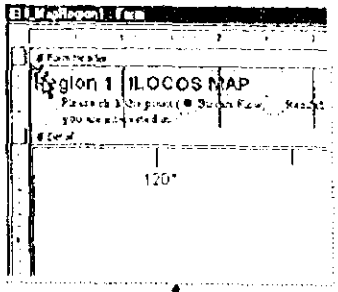




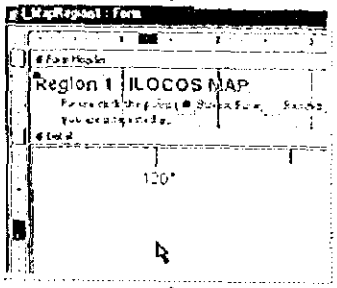

```
Private Sub AbraRiverBanaoangButton_Click()
    If Forms!f_MapSelectStation!DataType = "SW" Then
        Forms!f_MapSelectStation!st_id = 100
        DoCmd.DeleteObject acTable, "t_RiverOneData"
        DoCmd.OpenQuery "q_RiverOneDataFromMap"
        DoCmd.OpenForm "f_RiverOneStationInfo"
        DoCmd.Close acForm, "f_MapSelectStation", acSaveYes
        DoCmd.Close acForm, "f_MapRegion1"
    End If
End Sub
```



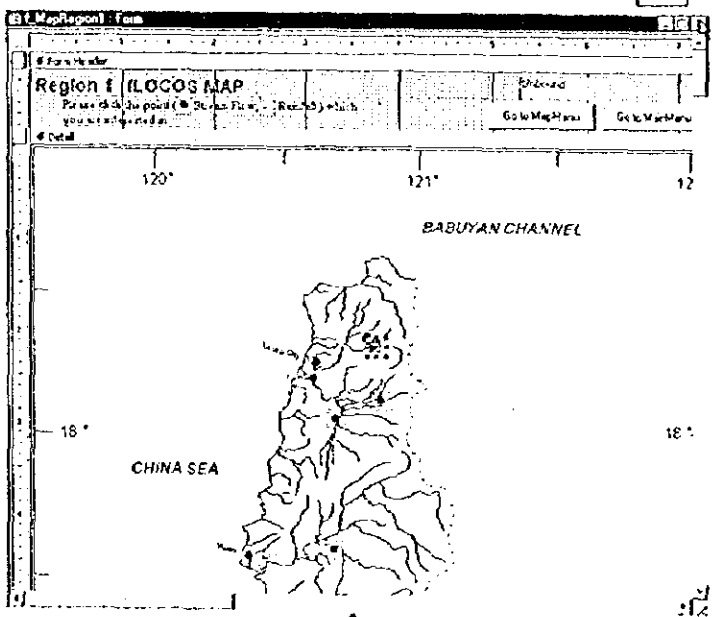
After encoded, click the 'Close' button.



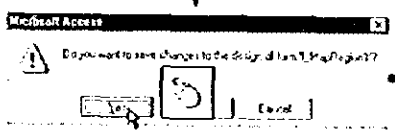
Select two objects in the upper left corner.



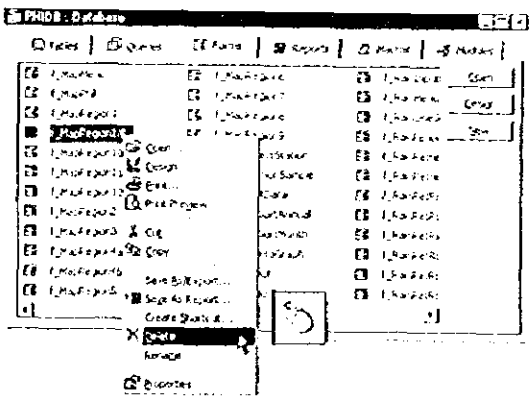
Press and hold down the left mouse button, and point to where you want to place, then release the mouse button.



Click the 'Close' button.



Click 'Yes' button.



Select the 'f_MapRegion1(R)', click the right mouse button, and then click Delete

And click the 'Close' button.

3.3 Output Samples

1) Mean Monthly Discharge Data Table

NATIONAL WATER RESOURCES BOARD | MEAN MONTHLY DISCHARGE DATA TABLE

STATION NAME : TENANE RIVER, TENANE, WRIGHT, SAMAR

DRAINAGE AREA : 392 sq.kms.

PERIOD OF TARGET YEARS : 1959 to 1996

MEAN MONTHLY DISCHARGE, IN CUBIC METER PER SECOND

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1959							65.71	52.75	18.00	9.46	24.32	100.18	
1960	26.50	14.44	11.78	15.48	12.13	25.43	18.37	18.13	10.01	41.61	48.52	43.17	25.33
1961	47.07	18.25	10.30	8.87	15.32	9.02	8.81	28.30	11.34	17.18	21.80	15.92	15.48
1962	26.63	18.22	10.07	7.74	12.01	14.81	20.21	21.70	24.94	26.03	33.47	25.96	22.02
1963	57.86	11.83	8.86	7.80	8.60	13.66	18.07	58.87	22.24	29.74	32.76	27.40	22.84
1964	14.08	21.02	11.46	10.18	13.90	8.09	18.38	10.84	14.50	10.76	88.10	45.64	24.53
1965	41.22	26.48	32.04	16.24	20.83	33.14	88.85	10.61	13.77	17.18	42.84	106.28	34.41
1966	18.45	18.70	8.45	8.55									
1967					7.50	8.67	8.82	15.09	9.53	14.87	33.80	23.75	
1968	30.51	30.19	12.19	6.79	5.44	8.03	10.36	14.04	6.18	11.07	34.26	27.12	15.40
1969	8.67	8.33	4.48	4.16	3.96	7.16	12.83	10.07	16.58	18.01	18.85	33.21	11.64
1970	20.01	17.46	3.03	6.34	3.67	8.40	18.30	10.77	10.63	36.06	41.37	26.54	18.14
1971	20.80	37.24	27.70			36.30	31.52	7.92	8.53	34.02	18.05	15.76	
1972	87.40	11.96	9.00	8.55	3.90	15.23		4.45	57.90	4.87	25.06	30.14	
1973	18.37	7.77	8.80	8.48	6.04	8.13	6.93	7.23	18.02	24.30	30.43	34.01	16.74
1974	12.20	13.20	10.58	7.66		31.27	16.92	11.95	8.90	34.29	40.90	41.84	
1975	64.70	18.76	10.80	13.55	8.76	12.31	12.13	10.96	14.95	11.77	9.96	81.94	23.90
1976	81.89	32.67	10.95	9.30	18.67	44.85				12.20	24.47		
1977													
1978	12.70	21.61	13.80	11.61	10.82	10.82	13.06	10.63	27.07	21.80	20.63	37.08	17.46
1979	14.32	11.17	7.70				11.59	9.53	13.22	15.18			
1980													
1981													
1982													
1983													
1984												24.25	
1985	70.77	80.73	54.95	13.00	17.25	21.75	30.36	12.15	18.08	29.20	71.50	16.29	26.18
1986	96.63	17.01	22.84	96.90			47.71	30.24	13.00	40.08	23.42	20.35	
1987	14.09	7.38		6.00	4.60	4.29	7.93	40.25	13.00	16.36	81.30	32.80	
1988	18.01	11.31	8.47	8.26	7.21	10.45	18.84				111.38	53.90	
1989	145.10	81.80	67.32	26.88	54.74	27.00	18.50	17.82	18.02	33.25			
1990	39.70	15.13	10.94	8.21	16.73	43.31	20.89	20.08	11.21	34.00	56.31	29.73	25.67
1991	20.18	20.25	25.00	23.18	20.35	27.08	25.35	18.30	14.80	21.56	37.65	37.80	24.30
1992	18.16	13.96	8.84	8.85	3.21	7.64	17.83	11.82	8.43	17.63	20.26	13.34	12.34
1993							10.97	18.58	14.91	13.25	20.54	45.63	
1994	37.22	22.84	12.40	21.18	12.08	23.82	48.50	15.08	26.97	24.54	18.80	42.70	25.45
1995	32.63	13.80	12.13	61.63	43.93	13.75	26.01	27.80	55.16	42.64	57.38	51.51	32.62
1996	74.40	30.93	81.84	52.50	18.88	18.48	13.83	8.82	13.43	18.30	43.34	101.75	40.73
MEAN	37.50	22.42	17.78	18.88	12.81	17.40	18.18	17.58	17.06	22.79	36.82	46.21	22.72

Note : Blank means that the data are not available

2) Flow Duration Curve

NATIONAL WATER RESOURCES BOARD	FLOW DURATION CURVE

Station Information

Station Name : TENANE RIVER, TENANE, WRIGHT, SAMAR

Drainage Area : 392 sq.km

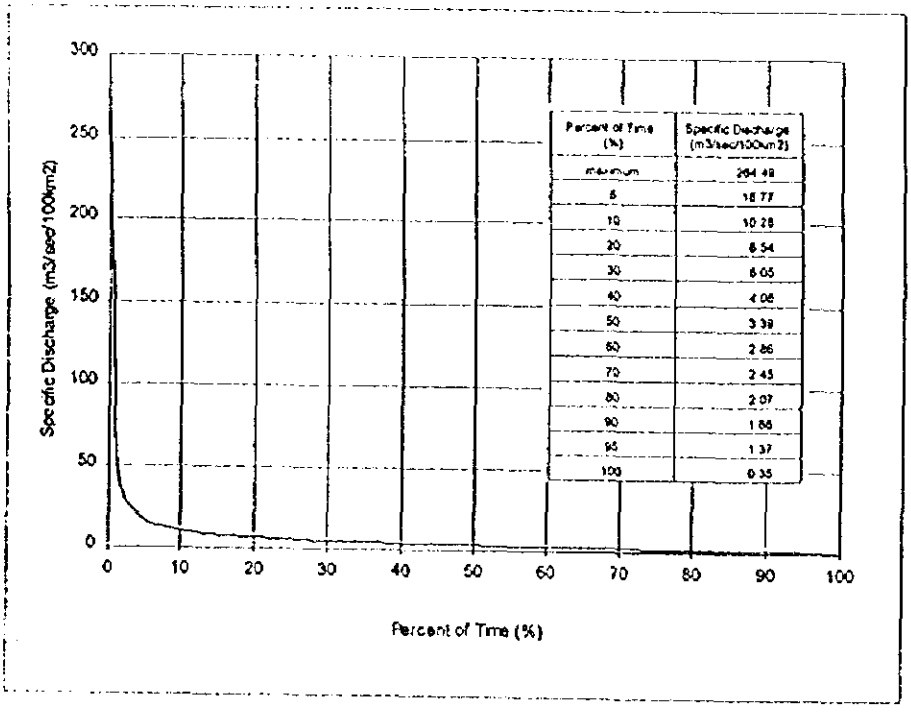
Period of Target Year : 1959 ~ 1996

Number of Availble Data : 10,360

Monthly and Annual Mean Discharge in cubic meter per second

JAN	FEB	MAR	APR	MAY	JUN	
37.38	22.40	17.79	15.67	12.85	17.84	
JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
19.15	17.55	17.06	22.70	36.82	46.21	23.85

Flow Duration Curve



3) Mean Daily Discharge Data Table

NATIONAL WATER RESOURCES BOARD	MEAN DAILY DISCHARGE DATA TABLE

Ulot River Basin

TENANE RIVER, TENANE, WRIGHT, SAMAR

LOCATION : Lat. 11 ° 48 ' 25 ", Long. 125 ° 08 ' 00 "
about 14 1/2 kms. from the town proper og Wright-Taft provincial road at Barrio Tenane.

DRAINAGE AREA : 392 sq.kms.

RECORDS AVAILABLE : 1959 to 1996

GAGE : Water-stage recorder. Elevation of zero of gage is 53.540 meters above mean Sea Level. Prior to January 7, 1960, staff gage read two times a day at same site and datum.

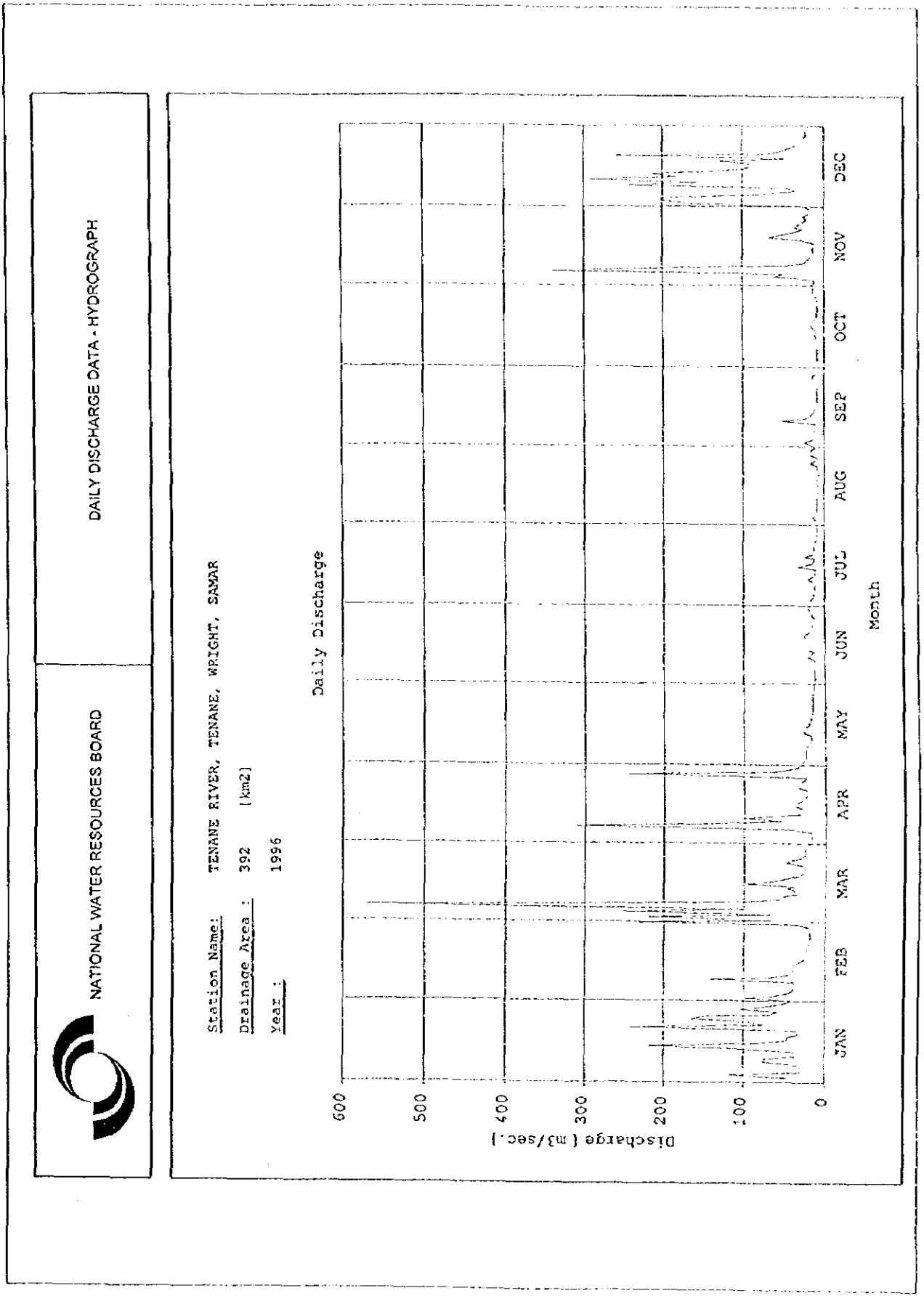
DISCHARGE, IN CUBIC METER PER SECOND

1996

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	41.95	94.80	250.83	19.35	35.00	15.50	17.80	8.70	16.00	8.40	15.20	34.76
2	47.80	84.26	87.26	16.00	20.15	12.85	15.20	8.70	23.88	8.10	11.80	164.61
3	110.38	47.80	219.58	17.90	23.88	12.85	17.80	9.80	14.00	8.75	11.84	199.15
4	30.80	60.30	67.28	17.80	34.76	12.25	14.40	14.40	12.90	8.75	86.50	202.84
5	28.50	40.30	250.88	17.60	23.88	11.80	13.50	8.90	14.20	8.80	49.78	92.00
6	30.30	34.84	90.55	64.50	28.20	11.90	15.30	9.50	11.58	8.10	330.18	48.70
7	33.80	34.10	508.48	310.88	24.30	11.58	12.80	8.70	10.20	8.70	211.80	58.50
8	74.43	141.25	348.95	127.15	21.15	11.20	13.80	8.70	8.50	8.70	41.90	60.90
9	74.40	73.60	101.35	84.50	18.80	11.85	17.80	8.40	10.20	8.90	50.50	241.84
10	37.54	45.90	58.70	101.58	18.00	11.90	14.00	8.10	52.70	8.30	25.40	154.95
11	34.43	41.40	68.50	64.30	18.00	21.80	25.53	8.10	25.53	10.80	15.80	290.25
12	34.65	36.10	34.50	52.00	17.20	17.00	13.30	9.10	17.80	8.70	10.40	181.27
13	90.80	40.30	38.00	28.50	26.10	14.90	11.55	7.80	13.50	11.66	14.60	211.50
14	210.25	38.00	47.30	30.50	27.00	20.10	11.55	7.50	11.55	6.00	14.00	170.72
15	67.20	29.80	37.86	37.00	23.53	21.90	10.85	8.10	11.55	12.95	14.80	87.86
16	47.90	37.00	85.40	34.50	20.10	19.35	32.50	7.50	10.20	15.20	13.30	91.55
17	47.30	25.88	61.60	26.30	20.25	21.15	18.40	7.30	8.30	13.20	13.85	88.80
18	37.00	24.30	44.70	25.85	18.00	22.95	15.80	8.10	9.30	12.86	20.85	127.15
19	33.90	25.40	33.00	23.40	16.80	27.00	12.25	8.10	9.30	11.55	90.00	63.50
20	38.00	22.05	26.90	21.80	16.40	22.50	24.75	7.80	9.00	9.30	52.70	258.65
21	241.84	21.80	26.10	32.05	18.40	18.35	14.40	7.50	8.10	8.40	34.90	72.00
22	78.00	21.80	24.75	34.00	18.00	18.90	12.80	8.40	8.10	8.10	28.10	52.10
23	81.65	20.10	24.75	31.90	18.00	15.70	12.80	8.70	8.40	8.10	38.50	43.10
24	165.45	20.10	46.10	29.50	15.80	15.20	11.53	8.10	9.80	8.70	31.00	35.00
25	146.95	18.80	40.90	25.70	15.20	14.00	10.50	18.00	11.55	7.80	25.68	31.50
26	94.00	19.80	29.50	33.05	15.80	12.85	9.80	10.20	14.90	8.90	30.25	29.00
27	90.80	19.35	25.20	245.00	10.40	18.00	9.90	9.30	16.40	8.10	25.68	20.10
28	102.05	21.18	25.20	81.25	15.20	14.40	9.80	11.00	10.65	12.25	18.80	22.40
29	84.80	35.00	25.65	40.65	14.40	16.80	9.30	10.00	9.80	14.80	47.80	23.50
30	81.50		22.95	53.50	14.00	20.25	9.30	10.40		14.00	18.80	22.05
31	40.85		21.15		14.00		8.50	10.50		14.80		20.10
TOTAL	2308.35	1134.84	2840.82	1576.95	808.80	484.25	426.35	304.50	349.15	318.15	1307.95	3154.22
MEAN	74.46	39.13	91.64	52.57	18.88	16.48	13.82	9.82	13.63	10.30	43.58	101.73
MAX	241.84	141.25	508.48	310.88	31.00	27.00	32.50	18.00	52.70	15.20	330.15	290.25
MIN	24.00	18.35	21.15	17.80	14.00	11.20	8.30	7.30	8.10	7.80	11.56	20.10
ES/OX	189.96	89.83	233.76	134.09	80.18	42.03	35.25	25.06	34.71	28.26	111.16	258.36
CM	50.84	25.09	82.82	34.78	13.64	10.80	8.64	8.71	8.58	3.03	21.82	88.52
KA-X	19644	8805	24548	13625	5267	4270	3701	2631	3000	2757	11297	27252

ANNUAL TOTAL = 14868.32 MEAN = 40.73 MAX = 508.43 MIN = 7.30 ES/OX = 1035.93 CM = 327.71 KA-X = 129461

4) Annual Hydrograph



5) Rating Table

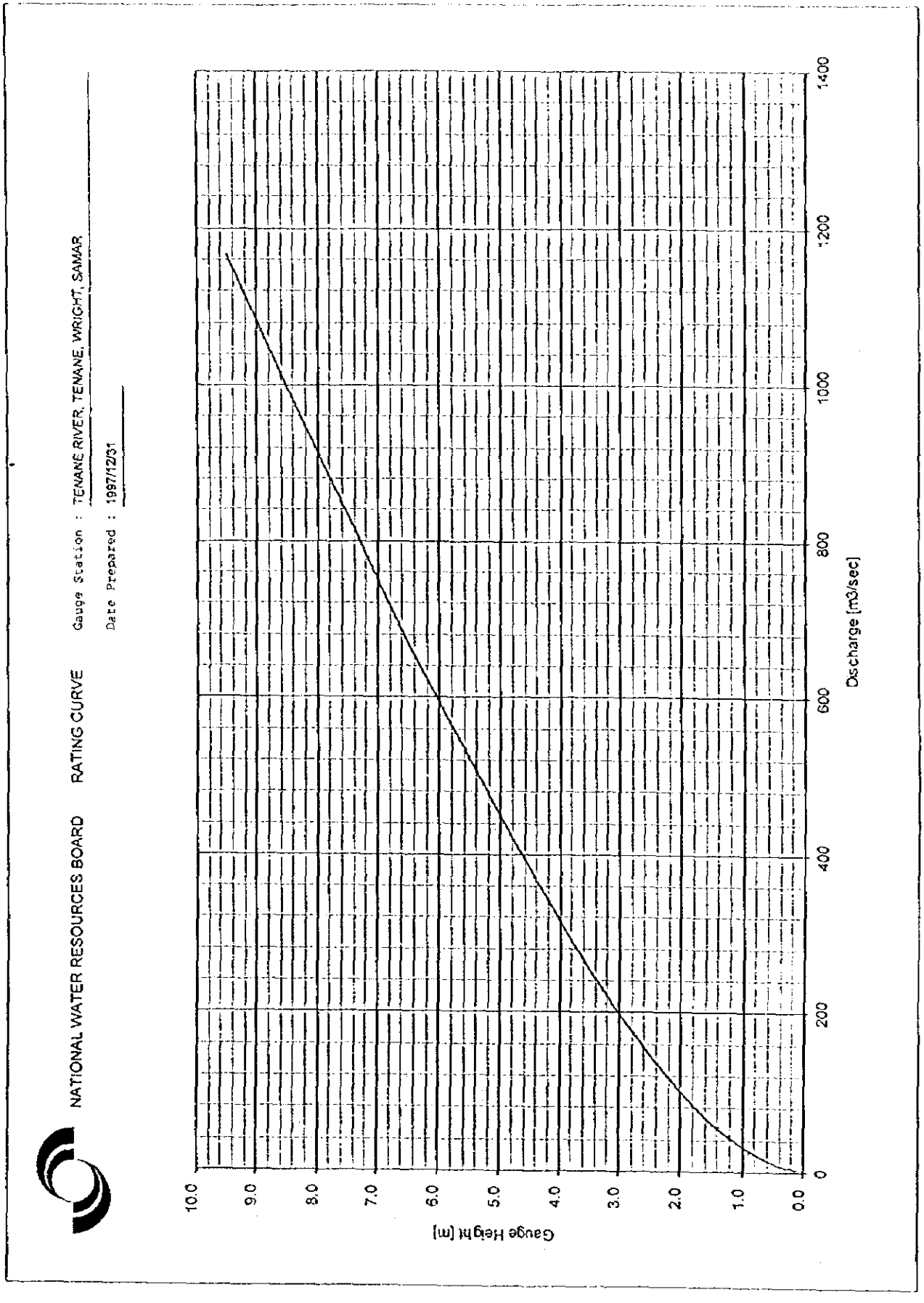
NATIONAL WATER RESOURCES BOARD | RATING TABLE | Station Code : V134_1 | Date Prepared : 1997/12/31

Gauge Station : TENANE RIVER, TENANE, WRIGHT, SAMAR

Gauge Height in meter, Discharge in cubic meter per second.

Gauge Height	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09	Difference
0.0											
0.1	3.500	3.600	3.700	3.800	3.900	4.000	4.100	4.200	4.300	4.400	
0.2	4.500	4.600	4.700	4.800	4.900	5.000	5.100	5.200	5.300	5.400	
0.3	5.500	5.700	5.900	6.100	6.300	6.500	6.700	6.900	7.100	7.300	
0.4	7.500	7.800	8.100	8.400	8.700	9.000	9.300	9.600	9.900	10.200	
0.5	10.500	10.850	11.200	11.550	11.900	12.250	12.600	12.950	13.300	13.650	
0.6	14.000	14.400	14.800	15.200	15.600	16.000	16.400	16.800	17.200	17.600	
0.7	18.000	18.450	18.900	19.350	19.800	20.250	20.100	21.150	21.600	22.050	
0.8	22.500	22.950	23.400	23.850	24.300	24.750	25.200	25.650	26.100	26.550	
0.9	27.000	22.500	28.000	28.500	29.000	29.500	30.000	30.500	31.000	31.500	
1.0	32.000	32.500	33.000	33.500	34.000	34.500	35.000	35.500	36.000	36.500	
1.1	37.000	37.550	38.100	38.650	39.200	39.750	40.300	40.850	41.400	41.950	
1.2	47.500	43.100	43.700	44.300	44.900	45.500	46.100	46.700	47.300	47.900	
1.3	48.500	49.100	49.700	50.300	50.900	51.500	52.100	52.700	53.300	56.900	
1.4	54.600	55.100	55.700	56.300	56.900	57.500	58.100	58.700	59.300	59.900	
1.5	60.500	81.250	62.000	62.750	63.500	64.250	65.000	65.750	66.500	67.250	
1.6	68.000	68.800	69.600	70.400	71.200	72.000	72.800	73.600	74.400	75.200	
1.7	76.000	76.800	77.600	78.400	79.200	80.000	80.800	81.600	82.400	83.200	
1.8	84.000	84.800	85.600	86.400	87.200	88.000	88.800	89.600	90.400	91.200	
1.9	92.000	92.850	93.700	94.550	95.400	96.250	97.100	97.950	98.800	99.650	
2.0	100.500	101.350	102.200	103.050	103.900	104.750	105.600	106.450	107.300	108.150	
2.1	109.000	109.875	110.750	111.625	112.500	113.375	114.250	115.125	116.000	116.875	
2.2	117.750	118.690	119.630	120.570	121.510	122.450	123.390	124.330	125.270	126.210	
2.3	127.150	128.090	129.030	129.970	130.910	131.850	132.790	133.730	134.670	135.610	
2.4	136.550	137.490	138.430	139.370	140.310	141.250	142.190	143.130	144.070	145.010	
2.5	145.950	146.950	147.950	148.950	149.950	150.950	151.950	152.950	153.950	154.950	
2.6	155.950	157.005	158.060	159.115	160.170	161.225	162.280	163.335	164.390	165.445	
2.7	166.500	167.555	168.610	169.665	170.720	171.775	172.830	173.885	174.940	175.995	
2.8	177.050	178.105	179.160	180.215	181.270	182.325	183.380	184.435	185.490	186.545	
2.9	187.600	188.655	189.710	190.765	191.820	192.875	193.930	194.985	196.040	197.095	
3.0	198.150	199.260	200.370	201.480	202.590	203.700	204.810	205.920	207.030	208.140	
3.1	209.250	210.375	211.500	212.625	213.750	214.875	216.000	217.125	218.250	219.375	
3.2	220.500	221.625	222.750	223.875	225.000	226.125	227.250	228.375	229.500	230.625	
3.3	231.750	232.875	234.000	235.125	236.250	237.375	238.500	239.625	240.750	241.875	
3.4	243.000	244.125	245.250	246.375	247.500	248.625	249.750	250.875	252.000	253.125	
3.5	254.250	255.450	256.650	257.850	259.050	260.250	261.450	262.650	263.850	265.050	

6) Rating Curve



Chapter 4

Irrigation Database

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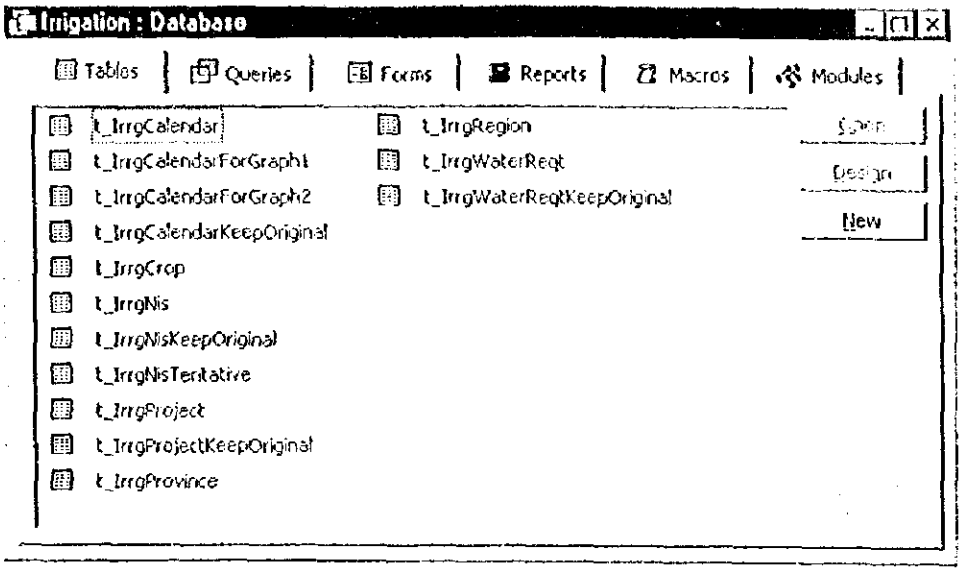
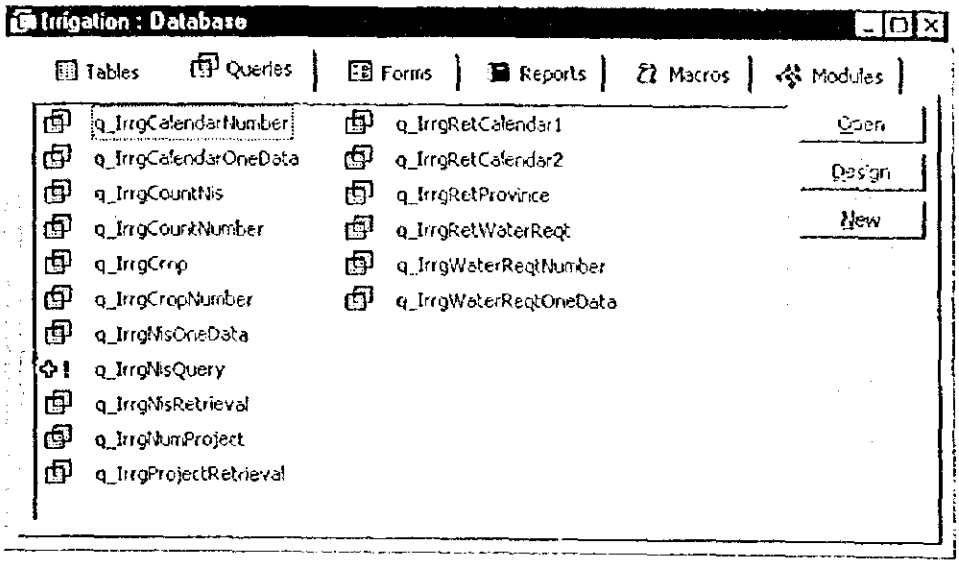
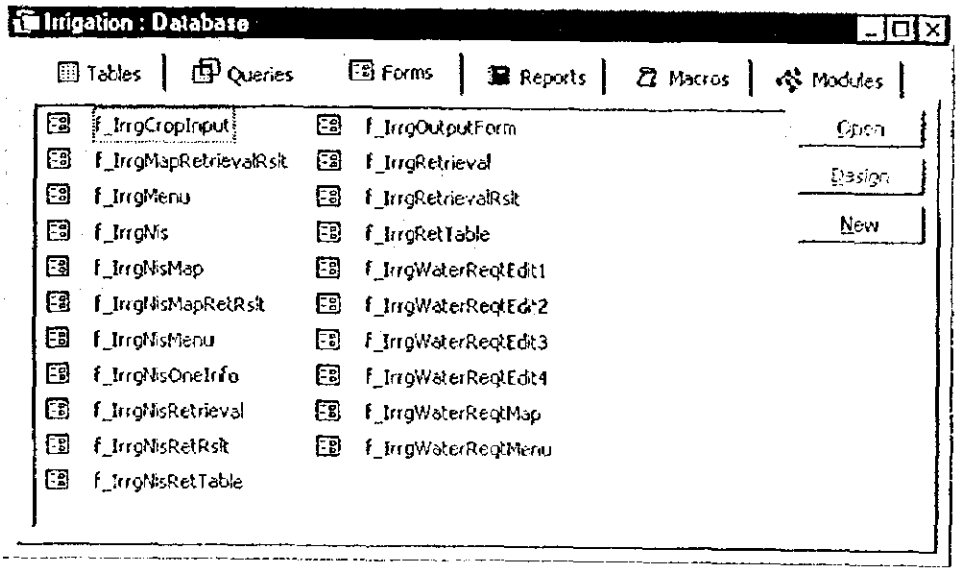
4.1 Database Components



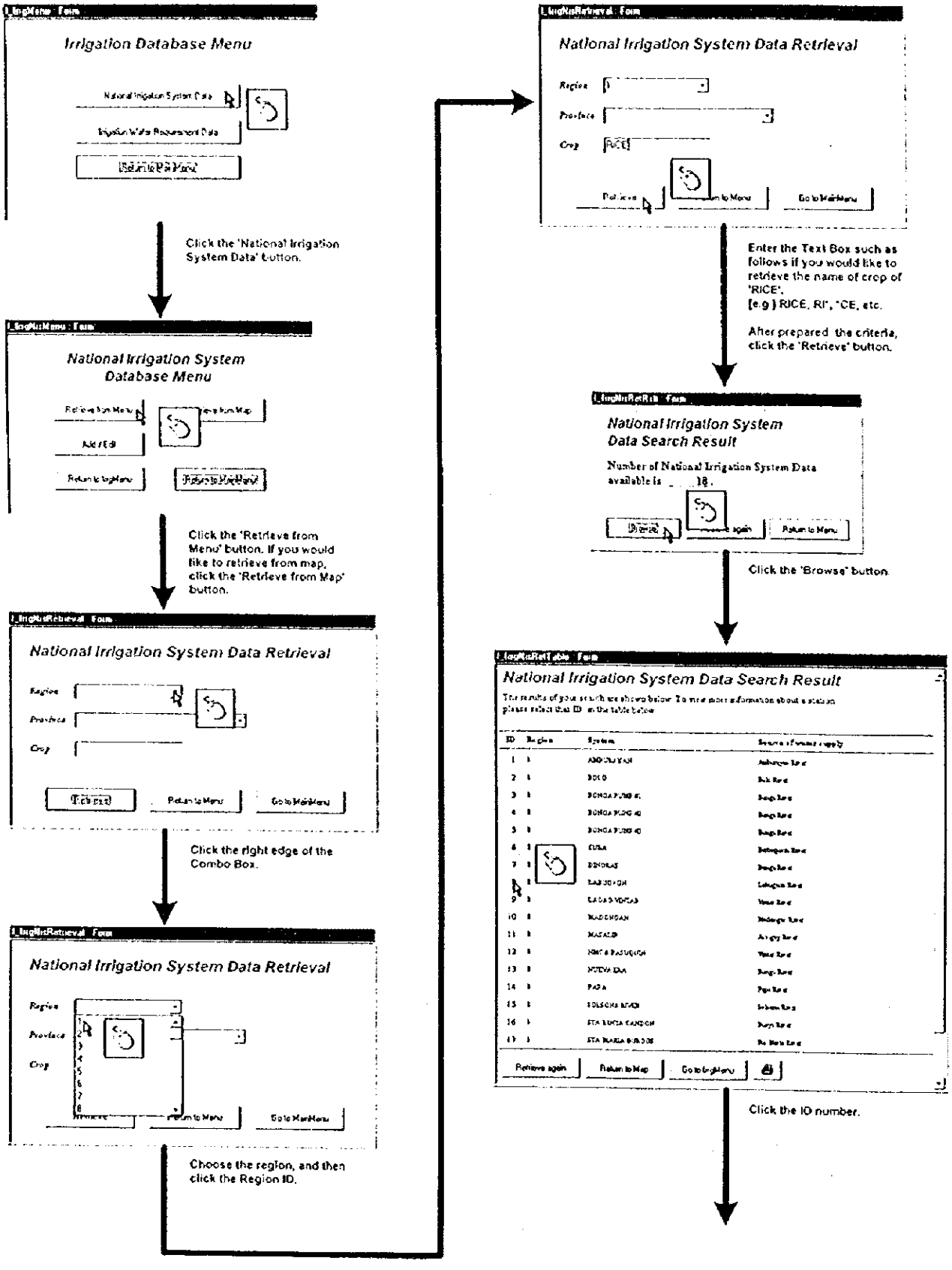


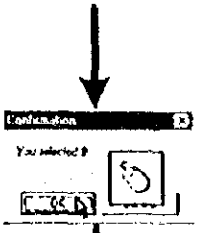


4.2 National Irrigation System Data

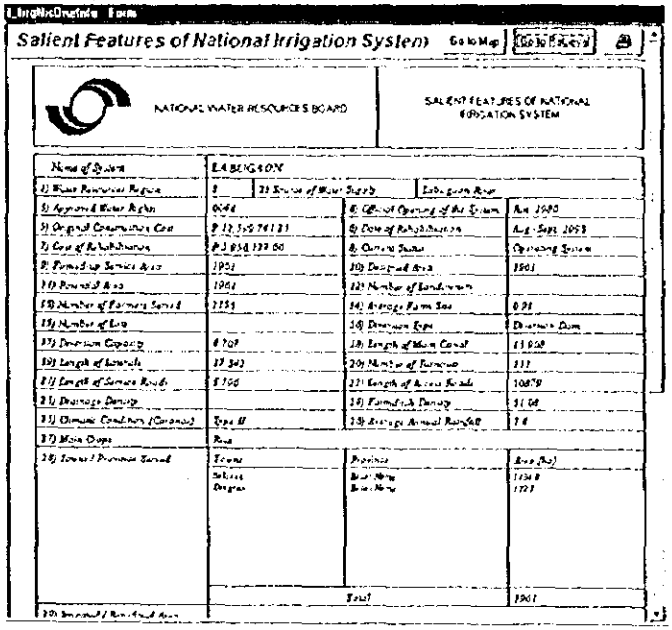
4.2.1 How to Retrieve

1) Using Retrieval Menu

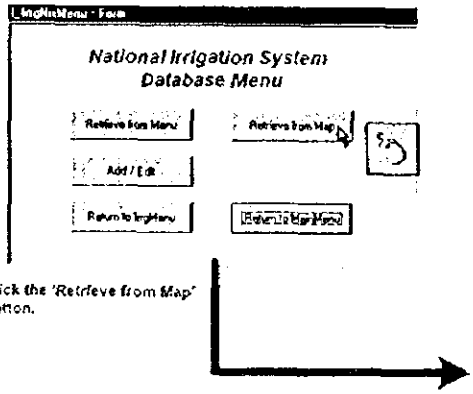




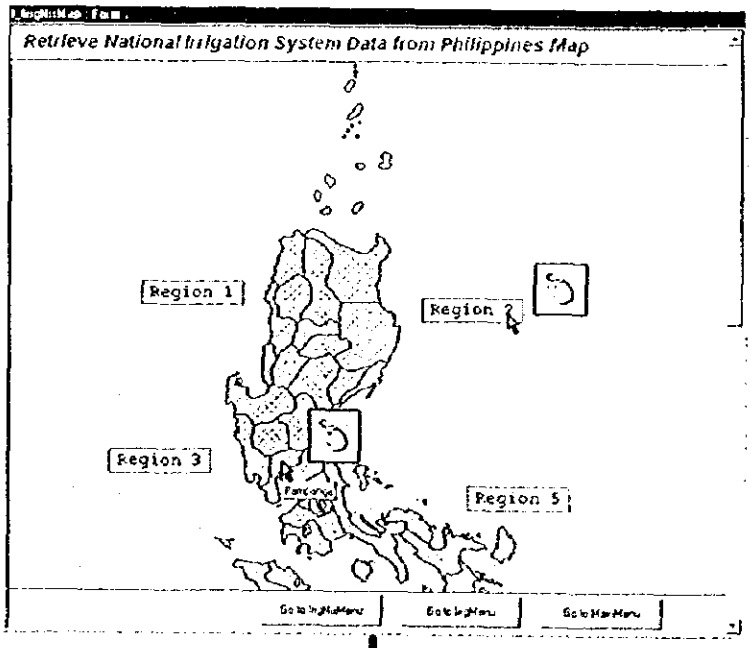
Click the 'OK' button.



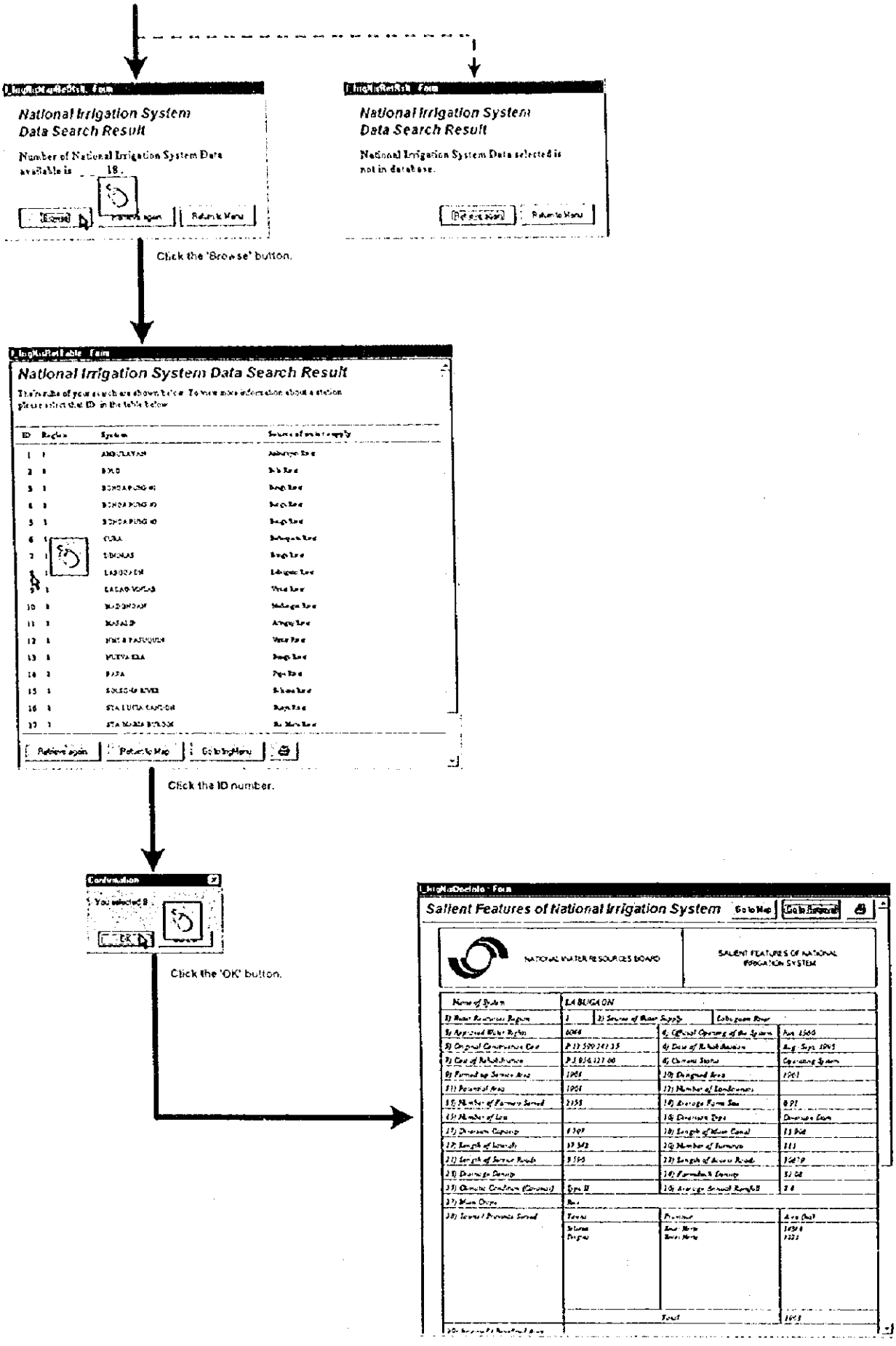
2) Using Retrieval Map



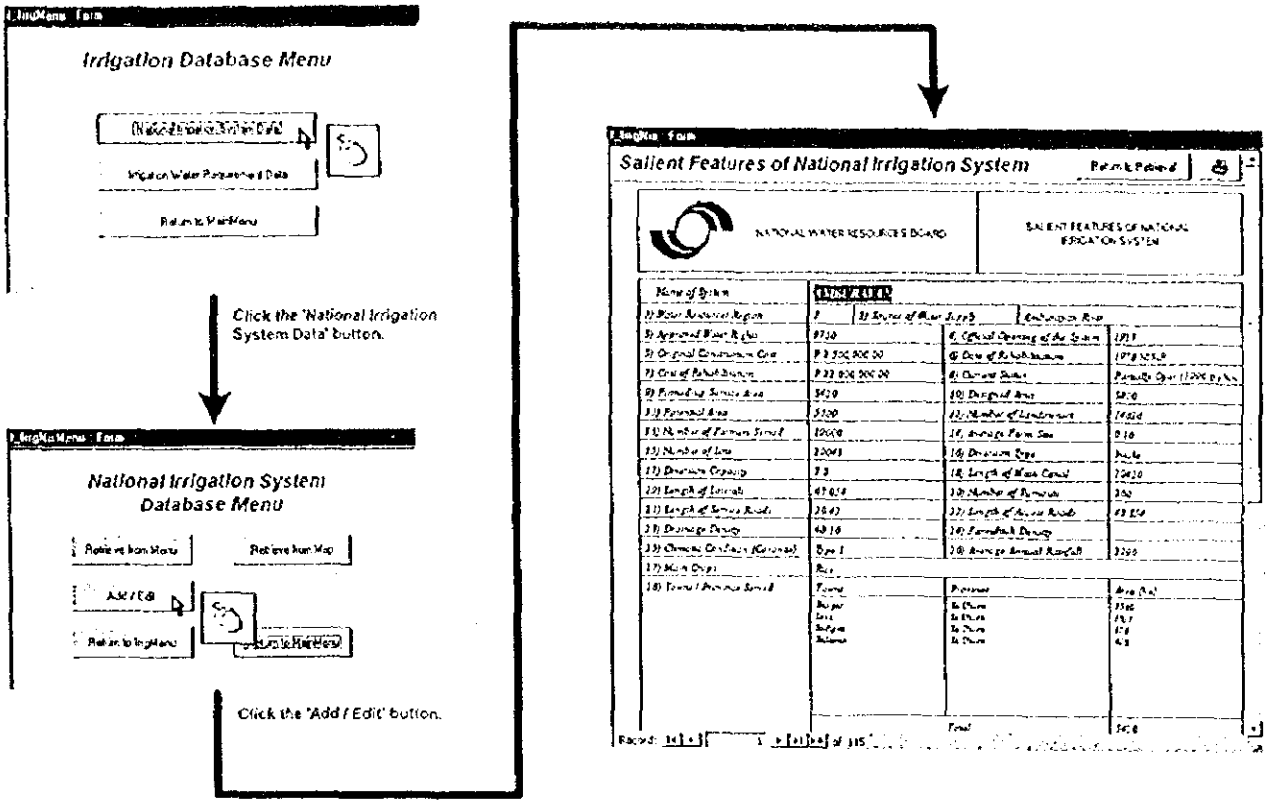
Click the 'Retrieve from Map' button.



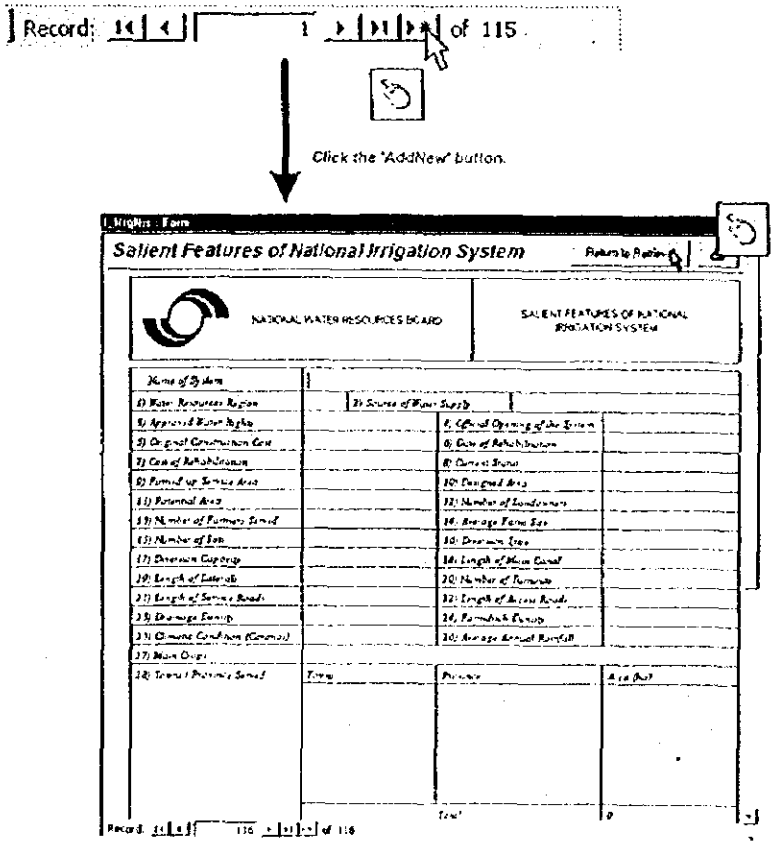
Click the province / region on the philippines map.


National Irrigation System
Data Search Result
Number of National Irrigation System Data available is 18.
National Irrigation System
Data Search Result
National Irrigation System Data selected is not in database.
Click the 'Browse' button.
National Irrigation System Data Search Result
Click the ID number.
Confirmation
Click the 'OK' button.
Salient Features of National Irrigation System
NATIONAL WATER RESOURCES BOARD
SALIENT FEATURES OF NATIONAL IRRIGATION SYSTEM
LA BUGAON

4.2.2 How to Add / Edit

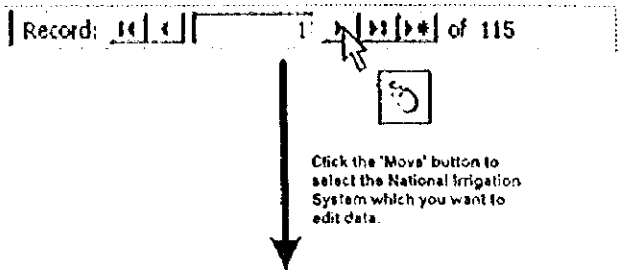


1) Add New Data

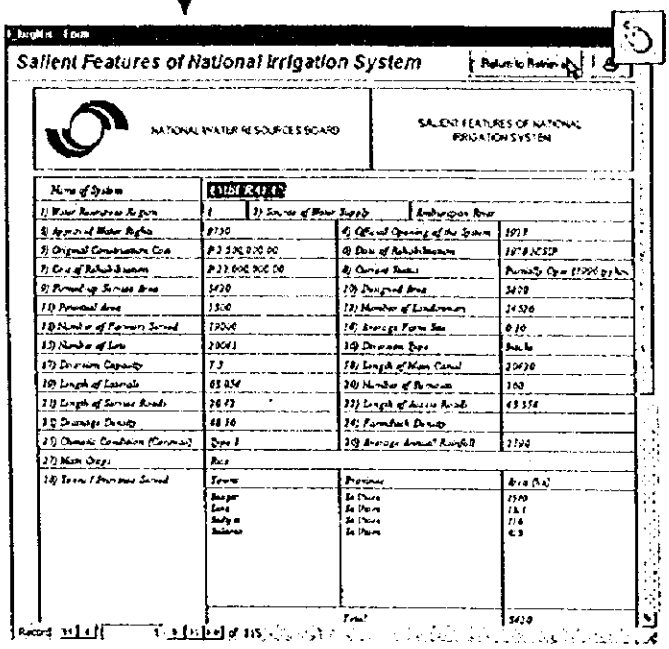


Enter the data into the Text Box of salient features, and then click 'Return to Retrieval' button.

2) Edit Data



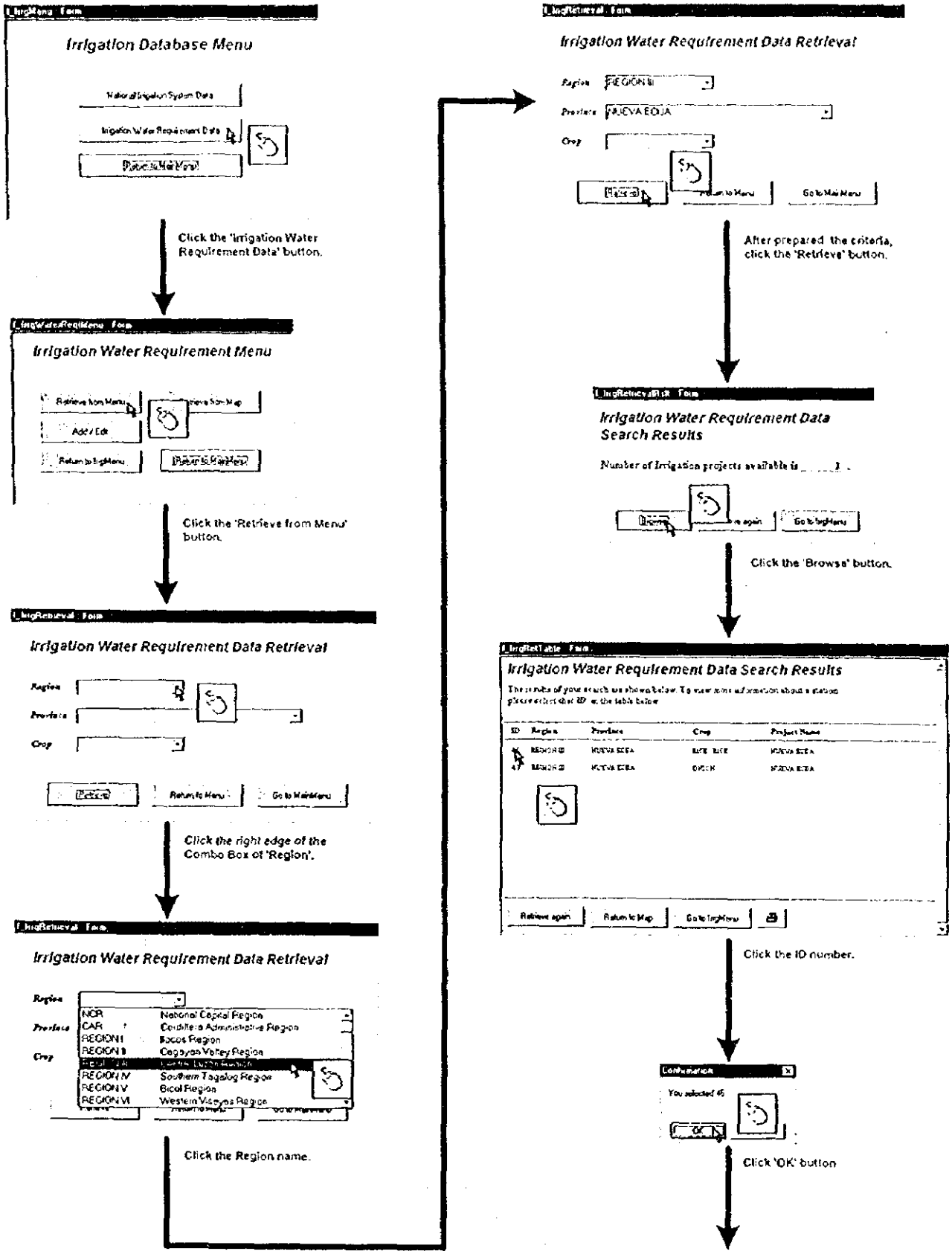
Click the 'Move' button to select the National Irrigation System which you want to edit data.

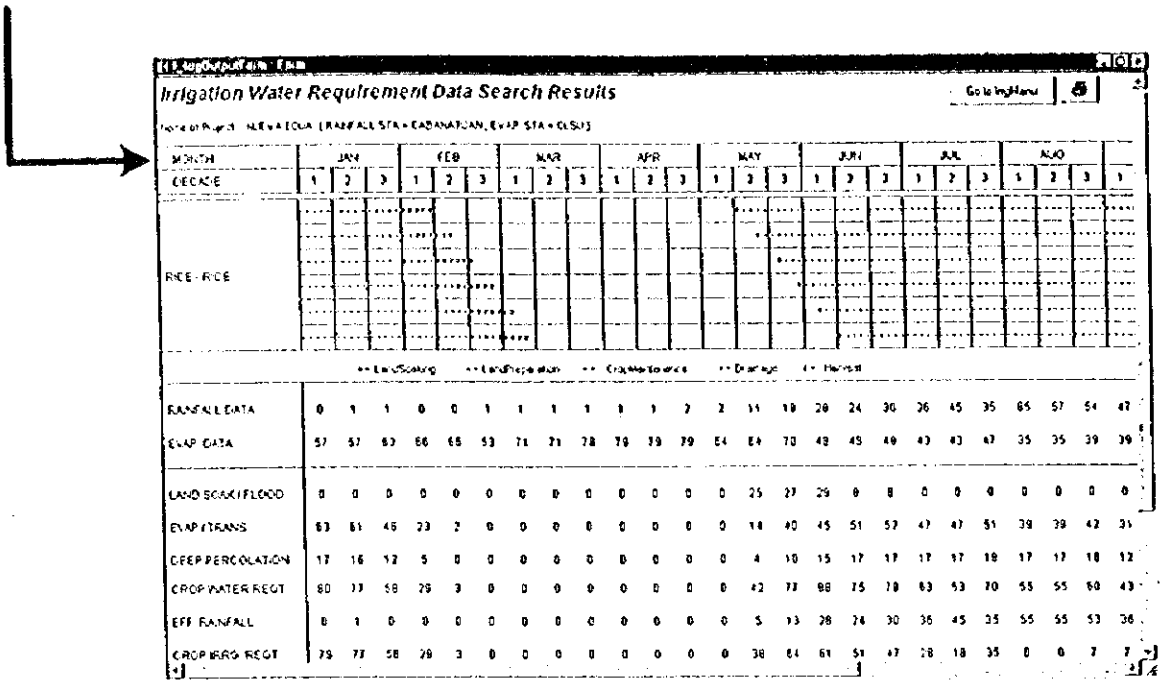


Edit the data into the Text Box of salient features, and then click'Return to Retrieval' button.

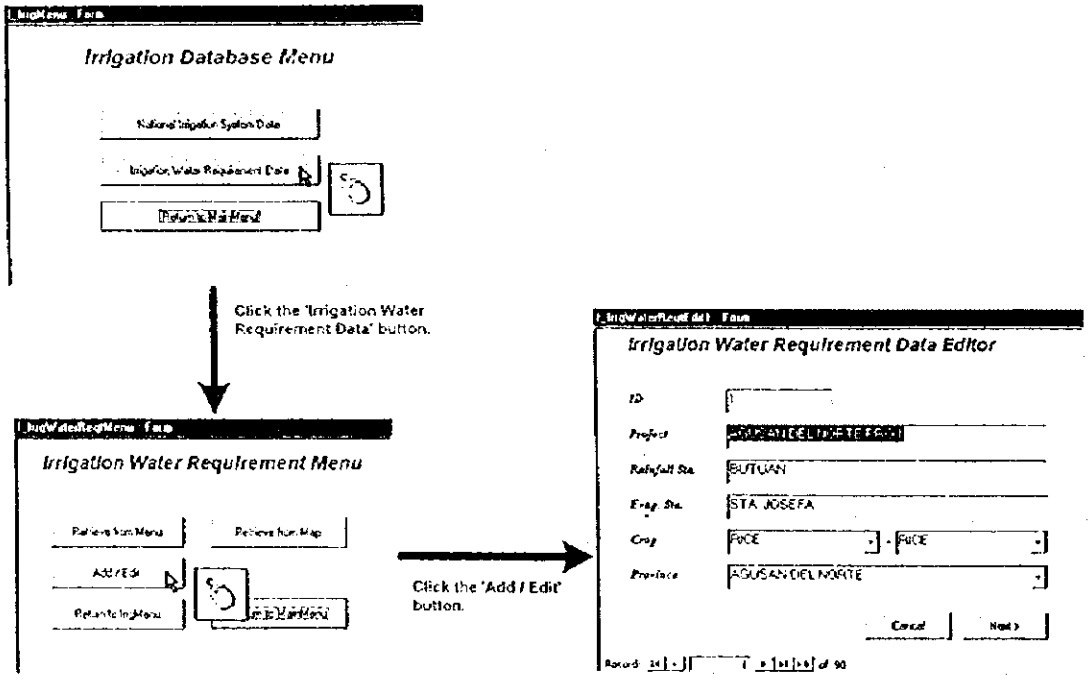
4.3 Irrigation Water Requirement Data

4.3.1 How to Retrieve

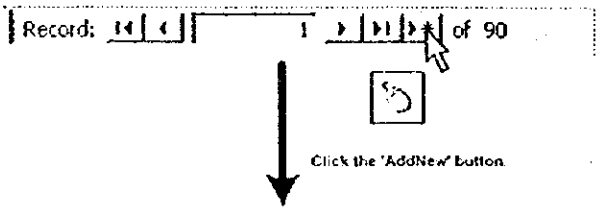


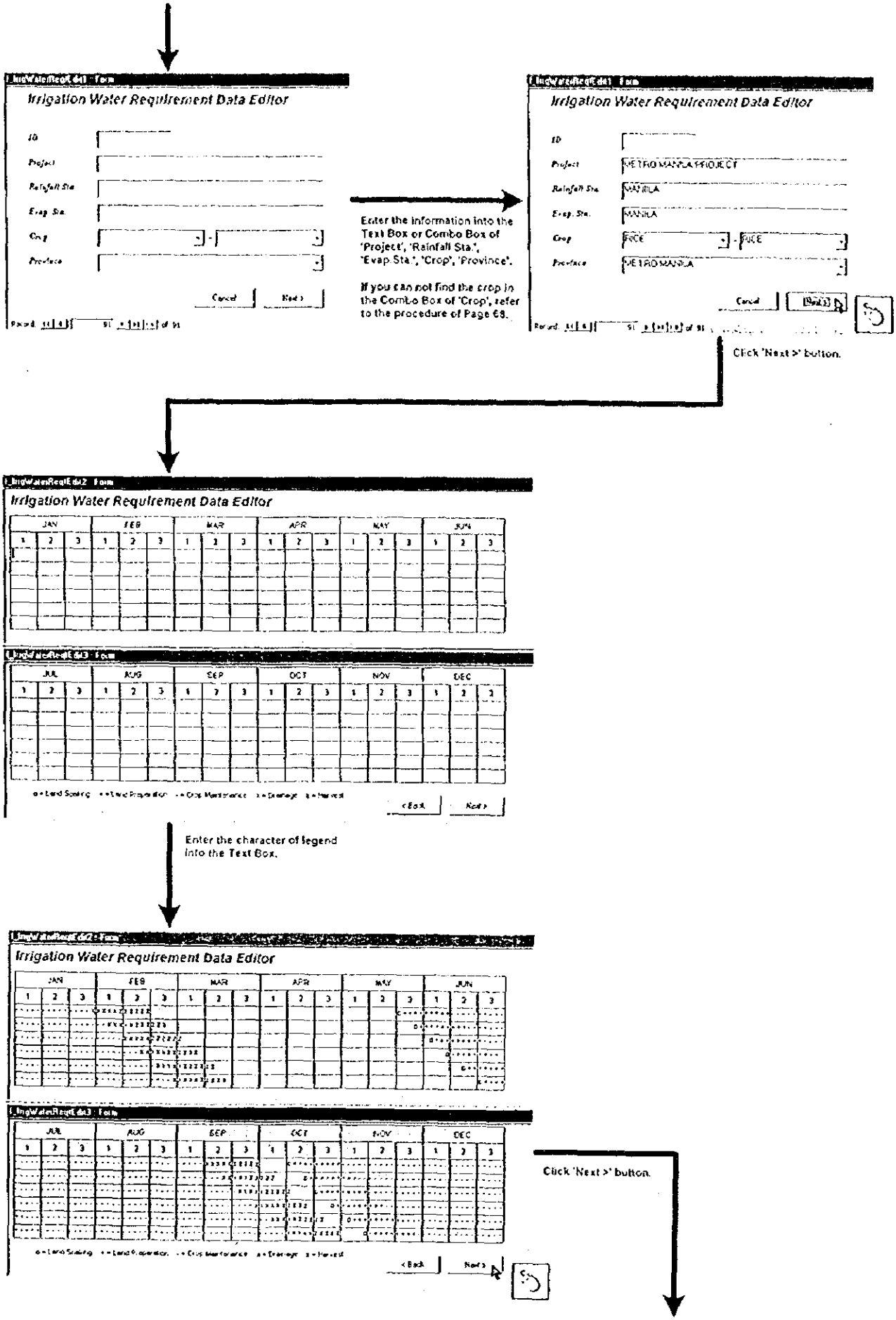


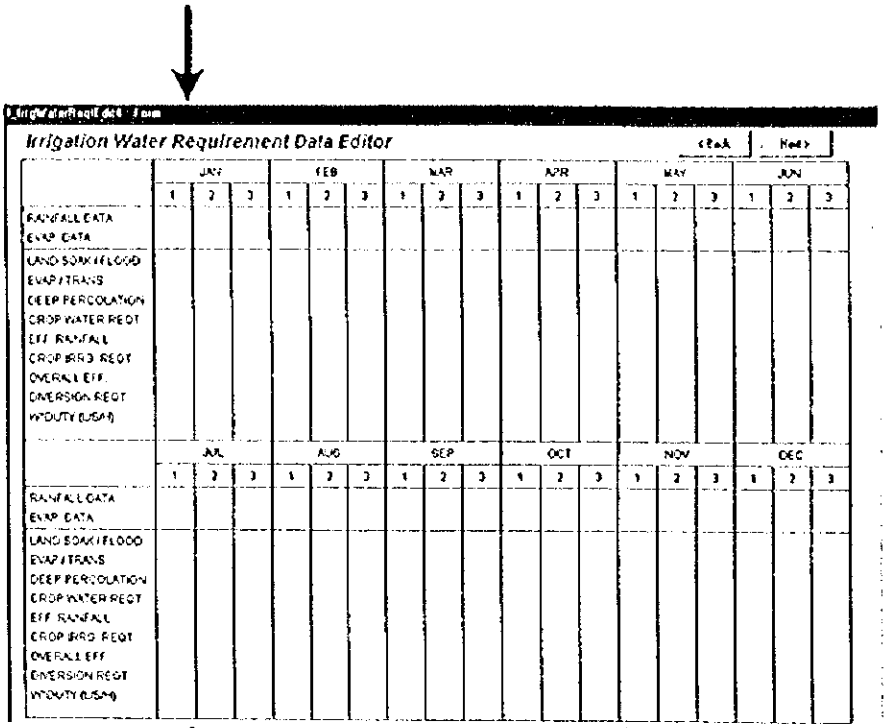
4.3.2 How to Add / Edit



1) Add New Data




Irrigation Water Requirement Data Editor
ID
Project
Rainfall Sta.
Evap. Sta.
Crop
Province
Cancel
Next >
Enter the information into the Text Box or Combo Box of 'Project', 'Rainfall Sta.', 'Evap Sta.', 'Crop', 'Province'.
If you can not find the crop in the Combo Box of 'Crop', refer to the procedure of Page 68.
PETRO MANILA PROJECT
MANILA
RICE
PETRO MANILA
Click 'Next >' button.
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
< Back
Next >
Enter the character of legend into the Text Box.
Click 'Next >' button.



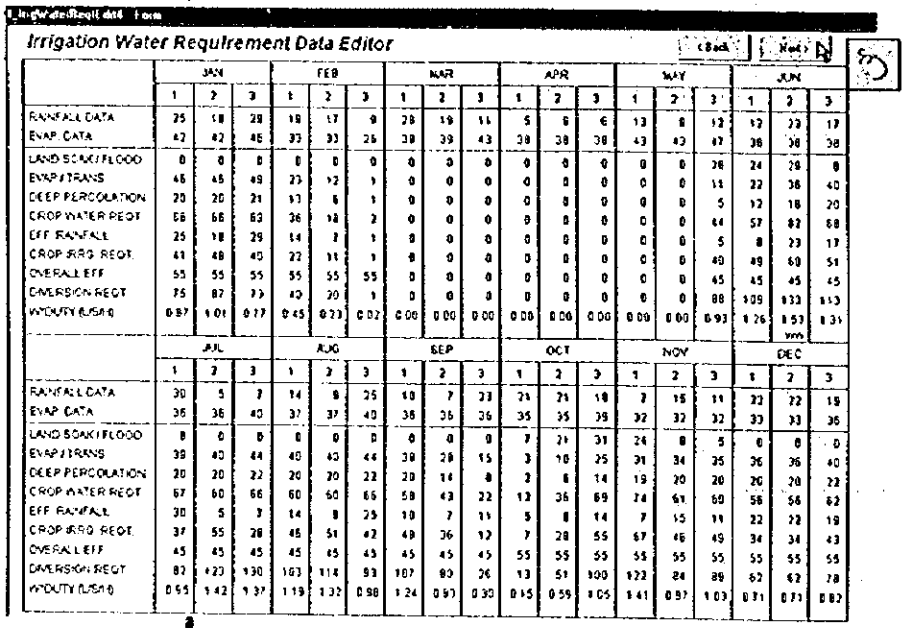
Irrigation Water Requirement Data Editor

<Back | Next>

	JAN			FEB			MAR			APR			MAY			JUN		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
RAINFALL DATA																		
EVAP. DATA																		
LAND SOAK/FLOOD																		
EVAP./TRANS																		
DEEP PERCOLATION																		
CROP WATER REQT																		
EFF. RAINFALL																		
CROP IRRG. REQT.																		
OVERALL EFF.																		
DIVERSION REQT.																		
W'DUTY (L/S/H)																		

	JUL			AUG			SEP			OCT			NOV			DEC		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
RAINFALL DATA																		
EVAP. DATA																		
LAND SOAK/FLOOD																		
EVAP./TRANS																		
DEEP PERCOLATION																		
CROP WATER REQT																		
EFF. RAINFALL																		
CROP IRRG. REQT.																		
OVERALL EFF.																		
DIVERSION REQT.																		
W'DUTY (L/S/H)																		

Enter the data into the Text Box.



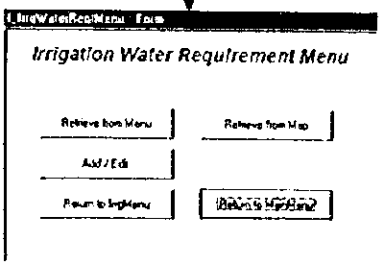
Irrigation Water Requirement Data Editor

<Back | Next>

	JAN			FEB			MAR			APR			MAY			JUN		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
RAINFALL DATA	25	18	28	18	17	9	28	19	11	5	6	6	13	8	12	12	23	17
EVAP. DATA	42	42	46	33	33	26	38	39	43	38	38	38	43	43	47	38	38	38
LAND SOAK/FLOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	24	28	8
EVAP./TRANS	46	46	49	23	12	1	0	0	0	0	0	0	0	0	11	22	38	40
DEEP PERCOLATION	20	20	21	11	6	1	0	0	0	0	0	0	0	0	5	12	18	20
CROP WATER REQT	66	66	63	36	18	2	0	0	0	0	0	0	0	0	44	57	82	68
EFF. RAINFALL	25	18	29	14	7	1	0	0	0	0	0	0	0	0	5	8	23	17
CROP IRRG. REQT.	41	48	40	22	11	1	0	0	0	0	0	0	0	0	40	49	60	51
OVERALL EFF.	55	55	55	55	55	55	0	0	0	0	0	0	0	0	45	45	45	45
DIVERSION REQT.	75	87	73	40	20	1	0	0	0	0	0	0	0	0	88	109	133	113
W'DUTY (L/S/H)	0.87	1.01	0.77	0.45	0.23	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	1.26	1.53	1.31
																	l/s/h	

	JUL			AUG			SEP			OCT			NOV			DEC		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
RAINFALL DATA	30	5	7	14	8	25	10	7	23	21	21	18	7	15	11	22	22	19
EVAP. DATA	36	36	40	37	37	40	36	36	36	35	35	39	32	32	32	33	33	36
LAND SOAK/FLOOD	0	0	0	0	0	0	0	0	0	7	21	31	24	8	5	0	0	0
EVAP./TRANS	39	40	44	40	40	44	30	28	15	3	10	25	31	34	35	36	36	40
DEEP PERCOLATION	20	20	22	20	20	22	20	14	8	2	8	14	19	20	20	20	20	22
CROP WATER REQT	67	60	66	60	60	66	58	43	22	12	36	69	74	61	60	58	58	62
EFF. RAINFALL	30	5	7	14	8	25	10	7	11	5	8	14	7	15	11	22	22	19
CROP IRRG. REQT.	37	55	28	46	51	42	48	36	12	7	28	55	67	46	49	36	36	43
OVERALL EFF.	45	45	45	45	45	45	45	45	45	55	55	55	55	55	55	55	55	55
DIVERSION REQT.	82	123	130	103	114	93	107	80	26	13	51	100	122	84	89	62	62	78
W'DUTY (L/S/H)	0.95	1.42	1.37	1.19	1.32	0.98	1.24	0.93	0.30	0.15	0.59	1.05	1.41	0.97	1.03	0.71	0.71	0.82

Click 'Next >' button.



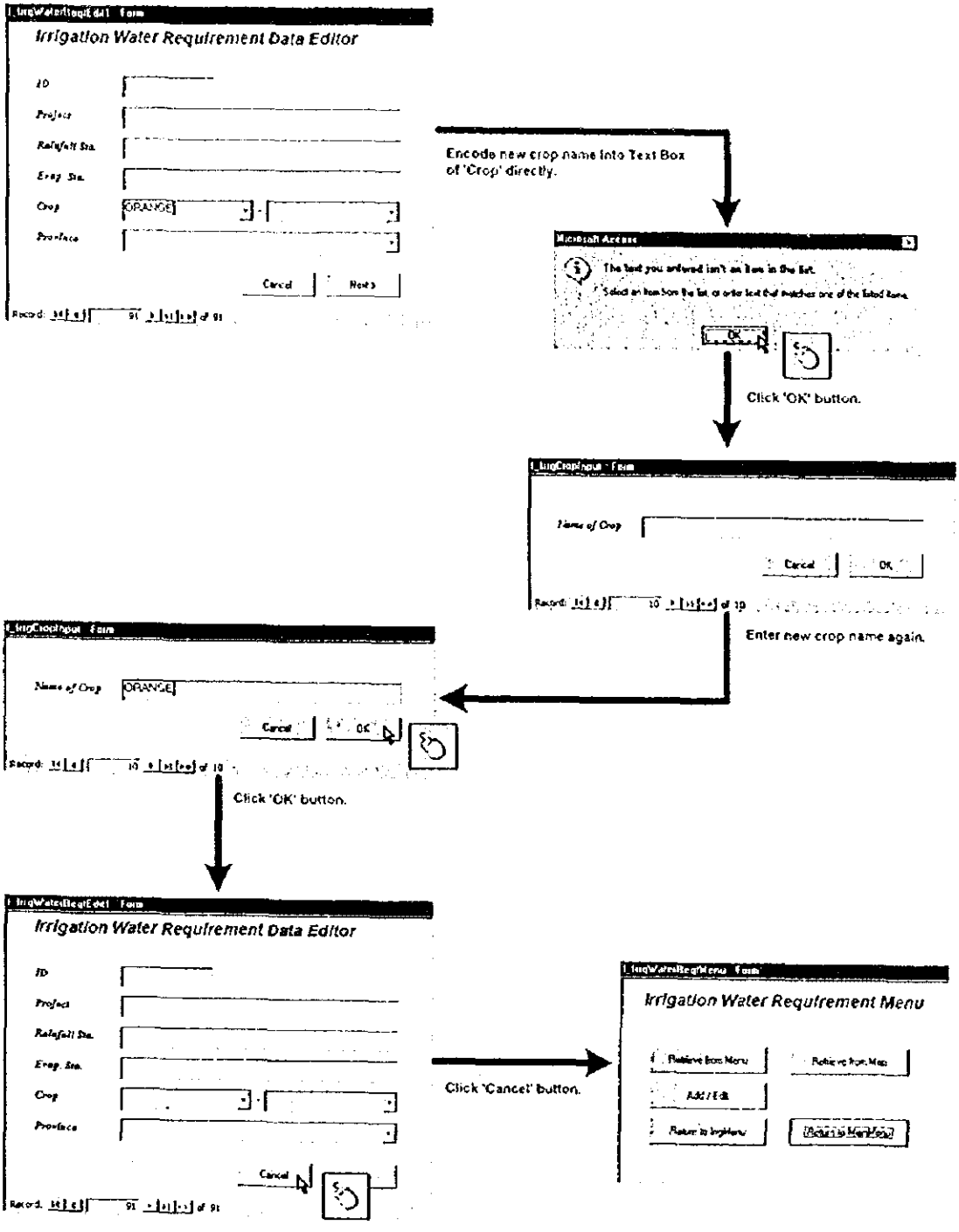
Irrigation Water Requirement Menu

Retrieve from Menu | Retrieve from Map

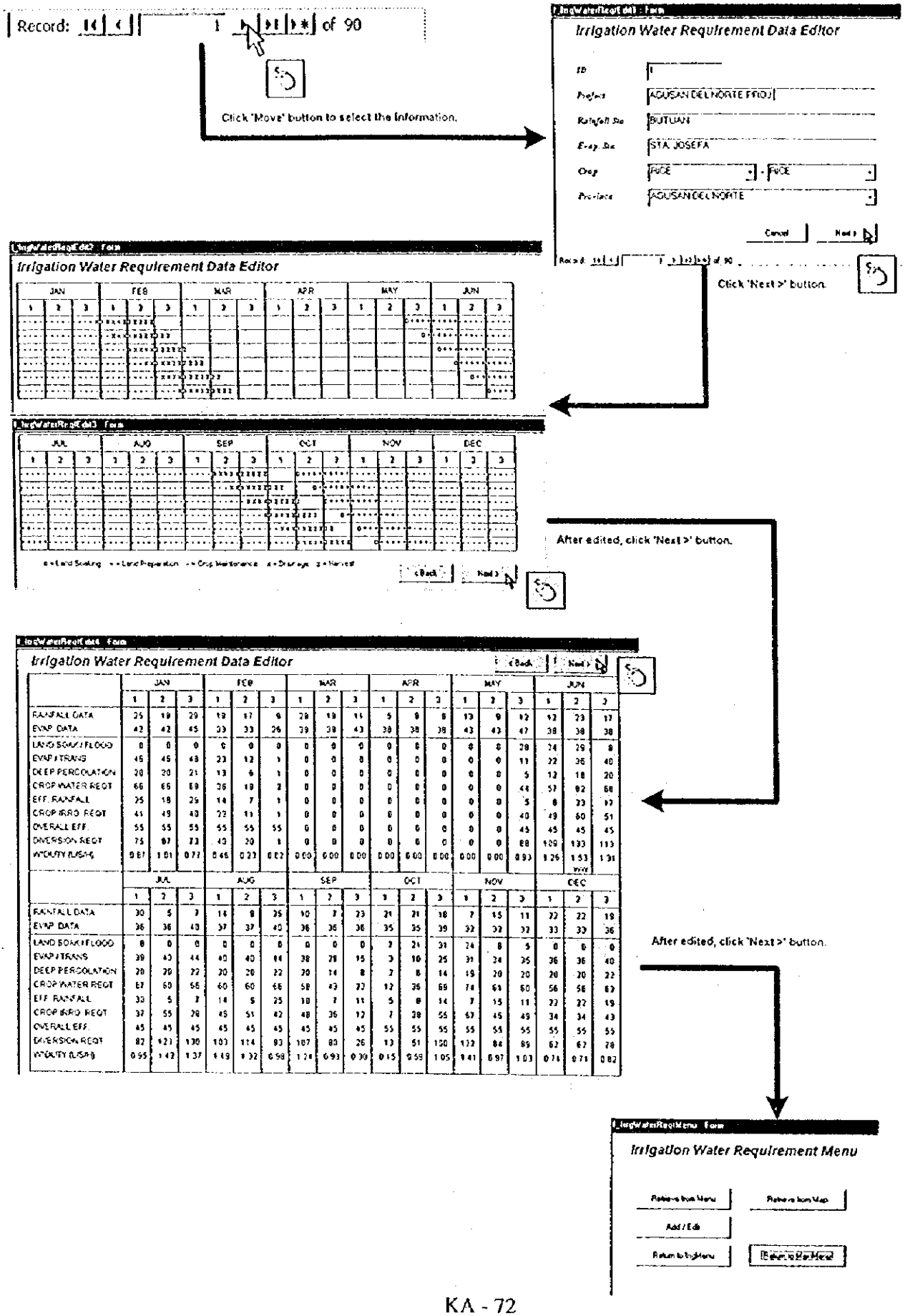
Add / Edit

Return to IrrgMenu | Delete Irrigation

If you can not find the crop in the Combo Box, new crop data is added by using following procedure.



2) Edit Data


Record: 1 of 90
Click 'Move' button to select the information.
Irrigation Water Requirement Data Editor
ID
Project
AGUSAN DEL NORTE FRIOJ
Rainfall Sta
BUTUAN
Evap. Sta
STA. JOSEFA
Crop
PADE
Province
AGUSAN DEL NORTE
Cancel
Next >
Click 'Next >' button.
Irrigation Water Requirement Data Editor
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
After edited, click 'Next >' button.
Irrigation Water Requirement Data Editor
< Back
Next >
RAINFALL DATA
EVAP. DATA
LAND SOAK/FLOOD
EVAP.TRANS
DEEP PERCOLATION
CROP WATER REQT
EFF. RAINFALL
CROP IRRG. REQT
OVERALL EFF.
DIVERSION REQT
VOLUME (LIS/HA)
After edited, click 'Next >' button.
Irrigation Water Requirement Menu
Retrieve from Menu
Retrieve from Map
Add / Edit
Return to Main Menu
Return to Map Menu

4.4 Output Samples

1) Salient Features of National Irrigation System

NATIONAL WATER RESOURCES BOARD

SALIENT FEATURES OF NATIONAL IRRIGATION SYSTEM

Name of System	LABUGAON				
1) Water Resources Region	1	2) Source of Water Supply	Labugaon River		
3) Approved Water Rights	6044		4) Official Opening of the System		Jun. 1936
5) Original Construction Cost	P 12,599,741.25		6) Date of Rehabilitation		Aug.-Sept. 1993
7) Cost of Rehabilitation	P 5,936,127.66		8) Current Status		Operating System
9) Firmed-up Service Area	1961		10) Designed Area		1961
11) Potential Area	1961		12) Number of Landowners		
13) Number of Farmers Served	2153		14) Average Farm Size		0.91
15) Number of Lots			16) Diversion Type		Diversion Dam
17) Diversion Capacity	4.707		18) Length of Main Canal		13.908
19) Length of Laterals	17.343		20) Number of Turnouts		111
21) Length of Service Roads	3.596		22) Length of Access Roads		10879
23) Drainage Density			24) Farmditch Density		31.08
25) Climatic Condition (Coronas)	Type II		26) Average Annual Rainfall		2.4
27) Main Crops	Rice				
28) Towns / Province Served	Towns		Province		Area (ha)
	Sobsoba		Ilocos Norte		1834.9
	Dingras		Ilocos Norte		333.1
			Total		1961
29) Irrigated / Benefitted Area					
Average	1985-1995				
Season	Wet		Dry		Third
Irrigated Area (ha)	1290		790		
Benefitted Area (ha)	1290		790		
Average Yield (cav/ha)	80		60		
30) Farmers Irrigators Association (FIA) with Memorandum of Agreement for Operation and Maintenance	Nature of Contract		Number of FIA	Length of Canal (km) under rehab	Area Covered (ha)
	Type III		6	31.25	1169.94
31) Future Expansion	Expansion of about 790 has. when the system is provided with drainage re-use structure in the d/stream areas & 650 has. When the Pol/siguan RAIPP, Phase II is implemented				
32) Deterioration of the System					
33) Other Information					

2) Irrigation Water Requirement Data

Name of Project : NUEVA ECIJA (RAINFALL STA = CABANATUAN ; EVAP. STA = CLSU)

UNITS : mm

MONTH	JAN			FEB			MAR			APR			MAY			JUN			JUL			AUG			SEP			OCT			NOV			DEC		
DECADE	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
RICE - RICE																																				

** LandSoaking ** LandPreparation ** CropMaintenance ** Drainage ** Harvest

RAINFALL DATA	0	1	1	0	0	1	1	1	1	1	1	2	2	11	19	28	24	30	36	45	36	85	57	54	47	53	45	14	11	7	9	6	4	1	3	2
EVAP. DATA	57	57	63	66	66	53	71	71	78	79	79	79	64	64	70	48	48	48	43	43	47	36	35	39	39	39	39	40	40	44	45	45	45	51	51	57
LAND SOAK / FLOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	25	27	29	8	8	0	0	0	0	0	0	0	0	7	21	27	28	8	5	0	0	0	0
EVAP / TRANS	63	61	46	23	2	0	0	0	0	0	0	0	0	14	40	45	51	52	47	47	51	39	39	42	31	16	4	11	25	42	48	50	50	57	57	62
DEEP PERCOLATION	17	16	12	6	0	0	0	0	0	0	0	0	0	4	10	15	17	17	17	17	18	17	17	18	12	6	1	5	10	17	17	17	17	17	17	18
CROP WATER REQT.	80	77	58	29	3	0	0	0	0	0	0	0	0	42	77	88	78	79	63	63	70	55	55	60	43	23	12	37	62	87	72	71	66	73	73	81
EFF. RAINFALL	0	1	0	0	0	0	0	0	0	0	0	0	0	5	13	28	24	30	36	45	35	55	56	53	36	21	9	6	8	7	9	6	4	1	3	2
CROP IRRG. REQT.	79	77	58	29	3	0	0	0	0	0	0	0	0	38	64	61	51	47	28	18	35	0	0	7	7	2	4	31	54	60	63	65	63	72	71	78
OVERALL EFF.	56	56	56	56	56	0	0	0	0	0	0	0	0	45	45	45	45	45	45	45	45	45	45	45	45	45	56	56	56	56	56	56	56	56	55	56
DIVERSION REQT.	144	139	105	52	5	0	0	0	0	0	0	0	0	67	141	135	113	104	62	41	78	0	0	16	16	4	7	57	97	148	115	119	114	131	128	143
WDUTY (L/S/H)	1.67 ****	1.81	1.10	0.80	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	1.49	1.56	1.30	1.20	0.71	0.47	0.82	0.00	0.00	0.17	0.18	0.04	0.08	0.88	1.13	1.53	1.34	1.38	1.32	1.51	1.49	1.50

NOTE : Rainfall data is for 80% probability of occurrence or 4 out of 5 years.

**** = CRITICAL